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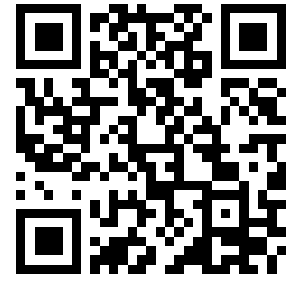
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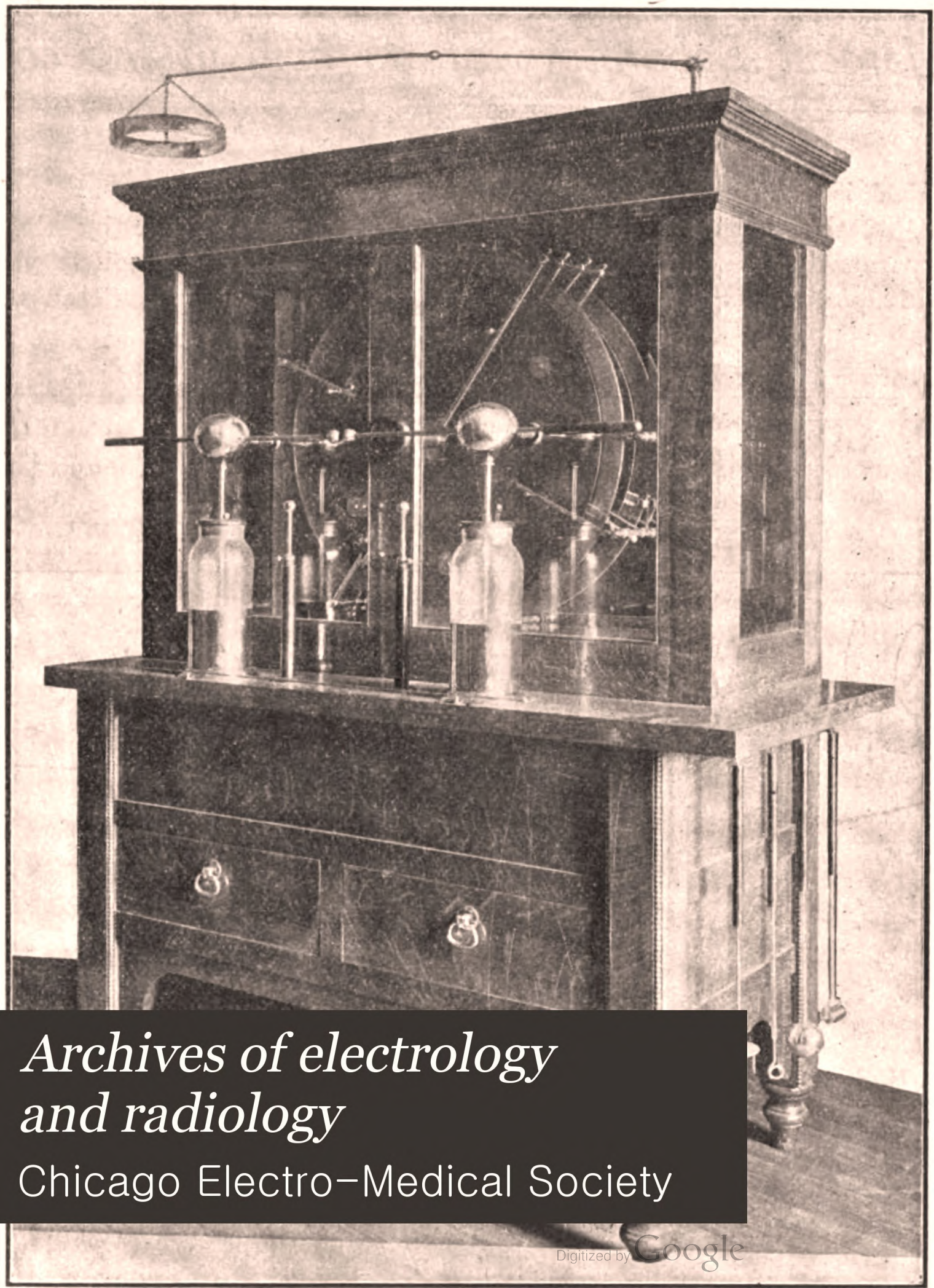
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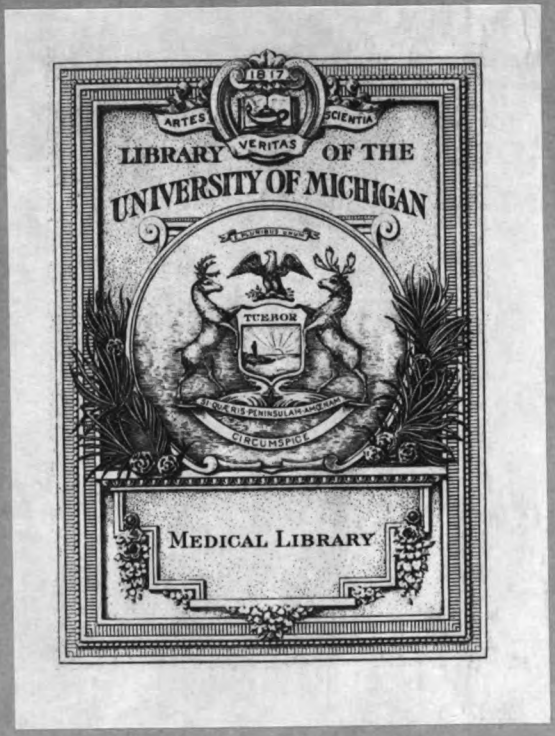




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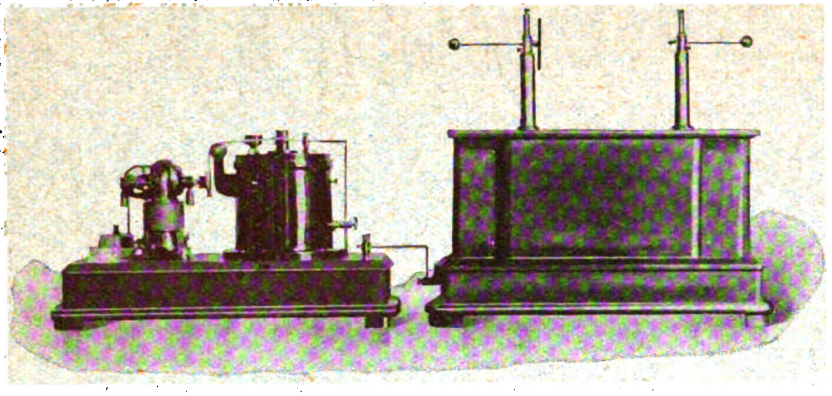
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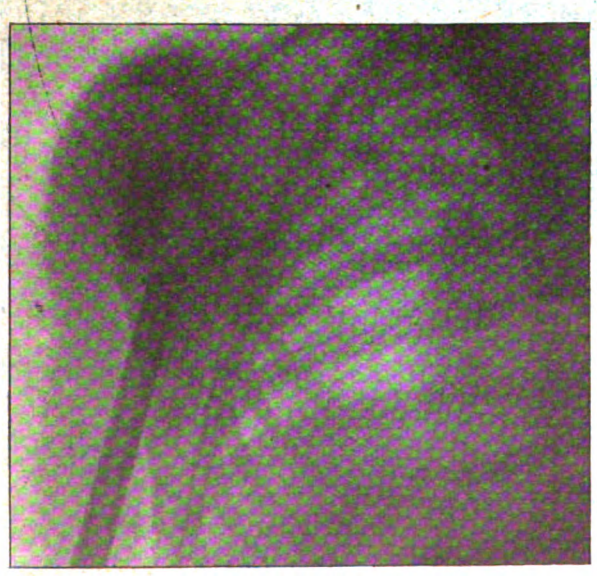
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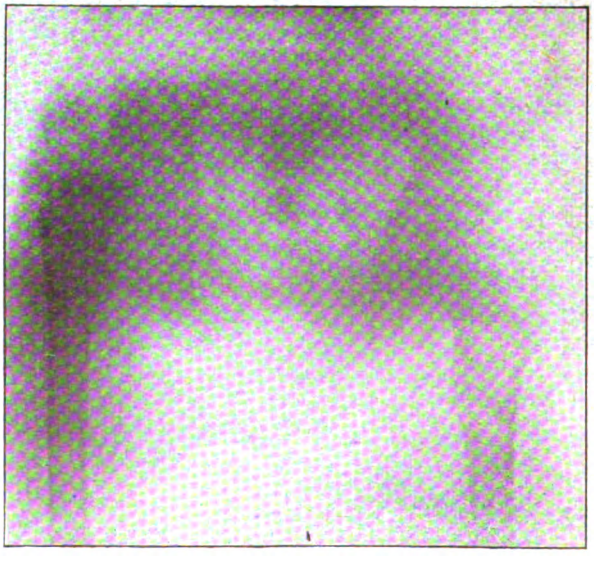
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FRACTURE OF UPPER ARM.
Time of exposure five seconds.



FRACTURE OF HEAD OF FEMUR.
Time of exposure forty seconds.

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THE
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A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. 1. CHICAGO, JUNE 15, 1901. No. 1.

LUPUS HEALED WITH RÖNTGEN RAYS.

REPORT OF A CASE.

WM. ALLEN PUSEY, A. M., M. D.
Professor of Dermatology in the College of Physicians and Surgeons of Chicago, Medical Department of the University of Illinois.

The patient, a married woman, aged 38, was referred to me May 8, 1900, by Dr. H. B. Favill with a diagnosis of lupus and for treatment with Röntgen rays. The condition at that time is shown in the accompanying photograph, Fig. 1, which I took when I first saw her. The extent of the disease on the left side of the face and the neck is indicated in the photograph. It also extended over on the right side of the chin and up on the right cheek beyond the angle of the mouth. This entire area was covered with lupus ulcers and unhealthy scars. The ulcers were the typical flabby, soft, indolent ulcers of lupus covered with reddish-brown crusts. The scars were thick, red, band-like and very disfiguring. The scars were most marked under the chin and they were sufficiently rigid to materially interfere with motion. At many points in the scars there were recurrent ulcers. Typical "apple jelly" tubercles of lupus were easily demonstrable in any part of the diseased area. The point of greatest activity of the lupus was an area with a diameter of perhaps two inches around the left angle of the mouth. The ulcers involved the mucous membrane of the lips at this point, but no lesions were found within the buccal cavity. There was no evidence of tubercular involvement of the deeper structures. There were no deep sinuses and no tubercular glands. The case was, in short, a lupus and not a scrofuloderma.



Fig. 1.

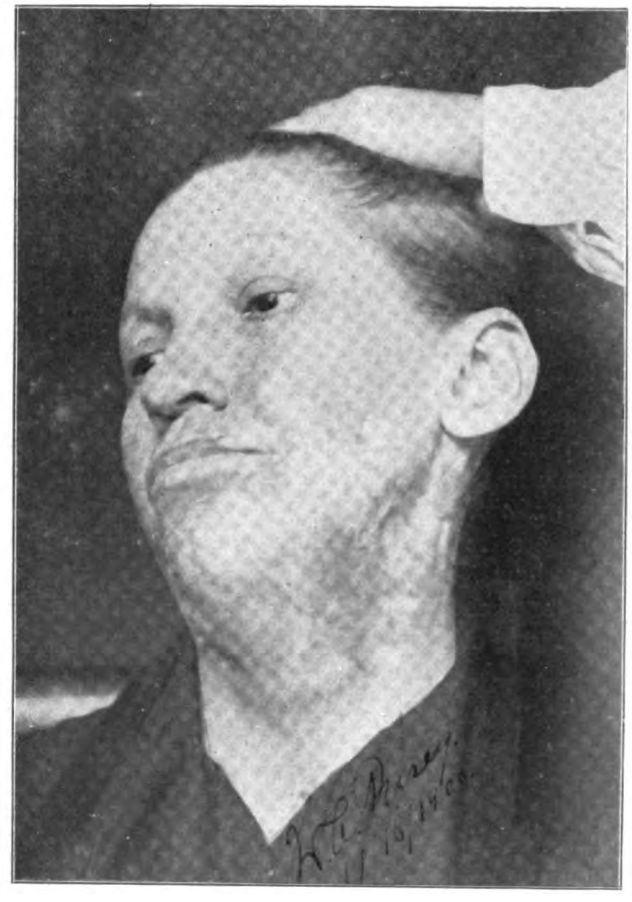


Fig. 2.

The disease began, the patient thinks, about four years ago in an innocent-looking ulcer the size of a pea on the neck and gradually spread from that point. The disease, however, was so benign in appearance that little attention was given it and no physician saw it. It is probable that it had existed some time before it attracted notice. The case had had no treatment before I saw it except the application of salves, which had

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had no influence on its course. It had steadily progressed from bad to worse, ulcers healing at times or new ones appearing, but more tissue constantly becoming affected. At the time the patient appeared for treatment her general condition was considerably run down, but without evidence of other disease than the lupus. There was no indication of tubercular involvement of the lungs. She had had the usual diseases of childhood, but has had no serious illness except an attack of appendicitis about five years ago. She has never, within her memory, had an eruption except the lupus. As a young baby she is said to have had an eruption of short duration after vaccination, which was probably an impetigo. Her father died at 69, of bladder trouble. Her mother is living, aged 60, but has been blind for thirty years and has always been "scrofulous." She has a brother aged 26 and a sister aged 32, both in good health. A brother aged 23 has a chronic cough. Several brothers and sisters died in childhood.

As to the diagnosis, the presence of the pathognomonic tubercles, the indolent ulcers with soft, reddish borders, the thick band-like scars showing recurrent tubercles and ulcers, the slow course and painless character of the disease are all characteristic of lupus and serve to differentiate it from syphilis or carcinoma. That the disease is not blastomycetic dermatitis, which sometimes so closely resembles lupus clinically, is shown by the absence of blastomycetes. I have sections made from a piece of tissue taken from the border of an active ulcer. These sections show the structure of tuberculous tissue. Tubercle bacilli were found in this tissue by me, and independently in other sections by Dr. Roehr, of the Columbus Laboratory. I was fortunate in having the case seen by Dr. H. G. Anthony, professor of dermatology in the Chicago Policlinic, when it first came to me; he agreed in the diagnosis of lupus.

The treatment which the patient has had in my hands has consisted of exposures to X-Rays after the method of Schiff and Freund, of Vienna. While the lesions were freely ulcerating, the surface was covered with boric-acid vaselin, and in the morning before the treatment by X-Rays the ulcers were lightly cleaned with cotton sponges wrung out of a weak bichlorid solution. The ulcers, however, were never washed with bichlorid solution, and the case has had no other local treatment. The patient has had no internal treatment of any kind until within the last month, and then only a pill of reduced iron, arsenious acid and strychnin, t. i. d.

Treatment was begun by exposure to X-Rays on May 8, and was continued daily, except Sundays, until May 26. By May 24 many of the lesions were clearing up and beginning to heal. May 26 the exposed surfaces showed some reaction from the effects of the rays; the lupus tubercles were brighter in appearance and the borders of the ulcers redder. Treatment was discontinued until June 4, by which time the reaction had almost disappeared. The treatment was continued from June 4 until June 21, daily, as before, when considerable dermatitis developed. This dermatitis was confined to the diseased tissue and did not involve the surrounding healthy skin which had been exposed to the rays. At this time the ulcers were healing rapidly. The treatment was discontinued until July 2, when reaction had entirely disappeared and almost all of the ulcers were healed. From July 2 till August 10 the treatments were continued, not daily, but with a few intermissions of three or four days as the condition of the face indicated. During this time there was gradual improvement in the condition, the remaining ulcers healing, tubercles being absorbed, and the entire surface becoming covered with healthy scars.

By the latter part of July the left side of the face showed few traces of the disease. The diseased area on the right side, however, which from the manner of making the exposures had received less of the effects of the rays than the left, still showed lupus nodules and open ulcers. Accordingly, additional exposures were begun directly over this area on July 30 and continued daily in a maximum amount until August 10. Under these extra exposures the lesions immediately began to improve and by August 10 had entirely healed. This observation, which is but confirmatory of similar observations made by Schiff and by Jones, leaves little room for doubt as to the positive effect of the rays.

On August 10 treatment was discontinued because of my going away. At that time the only evidence of lupus that I could find was at the angle of the mouth, where there was still a focus of the disease. On September 13 the patient returned; there was then no evidence of disease at any point except at the angle of the mouth, where the tubercles persisted. Treatment was resumed with exposures over the left angle of the mouth. September 20 the tubercles on the upper lip were breaking down and an elliptical ulcer the size of a little-finger nail had developed, which within the next few days began to heal. On October 2 some erythema over the exposed area had developed and treatment was given up until October 8. By October 8 the last lesion had disappeared. From October 8 to date the patient has had daily exposures on the left side of the chin and on the neck under the chin. These exposures have been continued for two reasons: 1, the old keloid-like scars had shown under the exposures great improvement in flexibility, softness and color, and it was desired to carry this effect as far as possible; 2, to destroy any concealed lesions still present. Since October 8 I have not been able to find any evidence of disease.

The technique of the treatment which I have used is that of Schiff and Freund. It consists of repeated exposures to a weak light of definite strength. The

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light is produced by a secondary current generated in an induction coil of 30 cm. spark-length, which in turn is energized by a very weak primary current. The primary current I have used is that recommended by Freund, namely, a current of 12 volts and 1½ amperes interrupted from 800 to 1,000 times per minute. The exposures are continued from five to fifteen minutes, and the distance of the tube from the surface varied from 15 to 5 cm. Adjacent surfaces are protected by lead masks. The object to be obtained by the exposures is, of course, to get the required effects of the rays without overstepping the bounds of safety.

The case is presented as one healed by exposures to Röntgen rays. The results of the treatment are indicated in photograph, Fig. 2, taken November 10. It is at once admitted that whether it is a complete cure or not can only be determined by the lapse of time. There remain now, excepting the scars, no evidences of the disease; and even should more or less recurrence of the lupus take place, I believe the results may still be called extraordinary. Attention is called to the character of the scars. The only thick ones left are those which were in existence before the treatment began, and they have become less prominent, much softer and more pliable. The scars which have taken the place of the ulcers present when treatment began are soft, thin, flexible and white, and are as healthy-looking as they could possibly be. At the beginning the scars on the neck interfered very considerably with motion; now they interfere scarcely at all.

Certainly none of the usual methods of treatment by surgical means could produce such a result. The only other method of treatment which is comparable, as regards the cosmetic results, is Finsen's treatment by ultra-violet light, and his results are probably the same as those attained by Röntgen rays. In celerity of treatment Finsen's method does not compare with that by X-Rays. Finsen's patients have about an hour's exposure daily for each 1.5 centimeter square of disease, and accordingly a cure is a matter of one or two years. In order to fortify the effects of the light, moreover, Finsen resorts to pyrogallic acid, curetting and other local adjuvants to treatment. The effect of the X-Rays is sufficient without these aids.

This method of treating lupus has been in use in some German and Austrian clinics for three years. Most of the work has been done by Schiff and Freund, of Vienna, and by Kummell, of Hamburg. Single, or a few, cases of lupus cured by this method have been reported by various men in Europe. My case is, as far as I know, the third reported in the United States. P. M. Jones* of San Francisco reported a lupus cured by Röntgen rays, and another showing improvement under treatment. The second case was reported in the Journal, November 10, by Dr. J. T. Knox of Cincinnati, 103 State street.—Jour. Amer. Med. Association.

*Philadelphia Medical Journal, Jan. 6, 1900

For the X-Ray Era.

X-RAY TECHNIQUE.

A Paper read before the Southwest Iowa Medical Association.

By W. L. KENNEY, M. D., Creston, Iowa.

We will direct our special attention to some original investigations along the line of development of X-Ray negatives. Machines are not being increased in efficiency. In fact, improvement is needed in the Crooks' tubes rather than in the machines to excite them. But it needs only a glance at the old negatives in comparison with the specially developed to see that here was an untrodden field for improvement.

The other points in technique will be handled from the standpoint of the every day surgeon, who wishes to own his X-Ray outfit, but expects to do a limited amount of work. The first query will be "What machine shall I buy?" Well, if you are not much of an electrician and have no money to spare, you do not want an induction coil. You can not use it for treatment. The X-Ray burns are nearly all charged up to the induction coils.

As to the static machine, you can not buy too good a one, but the general surgeon will be well fitted out with one of 12 or 16 plates of 30 in. diameter, if it will always excite. The plates should be glass. Hard rubber reverses polarity, and is not free from warping. Large mica plates can also be used. Glass is not free from breakage, but will not warp nor reverse polarity if kept clean. Above all things, get one that has the Toeppler principle incorporated, or you will lose religion trying to excite your machine. The accessory exciters are a nuisance and there is no excuse for them. Remember any machine will do well when the weather is favorable, and you need not expend more than $350 to do all that you need in an individual practice. When your machine is working don't unnecessarily open the case, thereby letting in dust and air that may be moist. Don't use calcium chloride under any circumstances. If you will use it, shellac your metal parts first, for it makes the nastiest mess possible on your glass, besides corroding your metal. Metal should be lacquered or shellaced anyway to protect from ozone. If your machine is on the self-exciting Toeppler plan, you will never need any drying agent in the case.

For those who may need it, our advice is to use fused caustic potassa in sticks. It gives off no fumes and is only a little slower than calcium chloride; you can re-fuse it readily without any such odor as calcium chloride gives, and break up into small pieces. (This is original, but can be relied upon.)

Conducting cords to the Crookes tube are quite a problem if you have a high vacuum tube to deal with. A very good tube is one that requires about 3 or 4 in. separation of the prime conductors, before current will pass through tube. This means a voltage of about 200,000. If, now, the vacuum has risen in your tube

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to a parallel spark gap of double this, you will not be able to insulate your conducting wires. The current with voltage of more than 1-10 of a lightning flash will break through several thicknesses of gum rubber. The best you can do is to get double rubber-covered wire, or as near it as possible, and draw two tubes of gum rubber over it, then wrap with tape. Ordinary rubber tubing is worthless on account of the minerals incorporated with it. Hard rubber tubing to go over a double insulated wire is very fine and costs 5 to 10 cents per foot for tubing, with 5-16 to 8-16 in. bore.

It is well to connect your Crookes tube with a spiral of flexible wire well insulated and wrapped with tape onto the tube; this is to avoid strain on the glass. Where the spiral hooks on to the conducting cord slip over a loose piece of rubber tubing and a six-inch piece of glass or hard rubber over all. These elaborate precautions are not necessary with medium vacuums, but a portion of this insulation will increase efficiency of any tube.

Shall I buy more than one tube? Yes, it is best to have one of moderate vacuum for the less difficult work, and for any demonstrations, using your best tube as little as possible. Some of the imported German tubes last a year with almost daily use, and they are very good tubes to buy. One tube will answer all purposes, however, if it is the best. Tubes with too high penetration are like gold nuggets that are too big—not yet in evidence. Other instructions are given in catalogues and books.

As regards fluoroscope, get the bario-platinum-cyanide, at least 5x7. Tungstate of calcium does not last long.

Screens are a luxury at near $100, and you can do your surgery without one; for the photographic plate can receive a continuous bombardment for 10 minutes in one point, while the impression is made on the retina in a fraction of a section, subsequent and succeeding impressions giving only continuity without aggregation of effect. We believe those people who prefer the screen to a negative can be made to change their minds if they will change their developing.

Now we come to the plate. Some writers say "use any plate," or "all plates are equally sensitive to X-Ray." This is a sad mistake. Here is a negative which represents an average plate. Here is a negative from a Cramer Isochromatic. The Isochromatic plate shows detail in shadow, and the shadows are clear and can be made to stay behind while the rest of the plate develops. This is doubly true when using the formula below.

Briefly, use Isochromatic plates of Cramer or the special X-Ray plates of Hammer and other manufactures; plate-holders can be improvised if you care for economy, from an ordinary plate box. Put plate in bottom, with film next cardboard. It is better to wrap in black paper first (folding ends of paper on back of plate) because the cardboard may contain Hypo. Cut down a 4x5 plate box cover and put in against back of plate to hold snugly in contact wth bottom of box. Put on cover and turn box over when exposing, so that film is uppermost. When box is in sunlight it is well to keep on the third cover just as the boxes come. Never have any printing over your film or box, as the dense carbon in the ink will cast a shadow. Time of exposure should be made as short as possible. You get just as good pictures—patient is less liable to move, hence your lines are sharp, and you lessen the chance of X-Ray burn to nil. Such outfits as are usually used should take a wrist in 15 to 30 sec.; elbow, 1 min.; knee and shoulder, 3 min.; chest, 5 min.; pelvis, 5 to 10 min. Double these times will not over-expose your plates, but double again will over-expose and you do not get so good a picture because of reversal of image. Your tube should be never closer than 10 inches from skin and preferably farther, as thereby you avoid distortion. Use some metallic screen over patient with ground connection, if you like, but I believe burns are X-Ray burns and not electric burns. You will never have any with static exciter and tube one foot away, with time of twenty minutes. All reported cases have varied from these points, and those with static of any exposure time can be counted on your hand.

Developing should be learned by yourself (if not already proficient). You can use up a box of 4x5 isochromatic in practice. Your photographer seeks a different picture from what you do. He wants soft lights and half-tone. You want contrast. He has three grades of light: high light, half-tone and shadow; you have but two, half-tone and shadow. Hence the formula contains five times the accelerator or alkali, and ten times the bromide which can be used in portrait work. The quantity of reducer or hydrochinon is also larger. Use your developer and pan at 70°. Let the dark room be same temperature. Have ready a larger pan than your tray, with a large body of water at 100°. Cold under-times a plate, and heat will do much for a weak exposure. X-Rays are almost always under-timed. Use 6 to 8 oz. on 8x10 plate. Put plate in tray, film side up, and pour developer on quickly, and with cotton (having in a piece of absorbent cotton as large as two fingers), rub lightly whole surface of film, that there may no spots be left behind; cover up from red light for two minutes, when rub gently with cotton again to move air bubbles; cover again until development has progressed, four minutes in all. No image appears sooner than one-half the total time required, and you will rarely over-develop in four minutes if 70° is not exceeded. When high lights are black with image somewhat fogged and bone showing faintly as you look down into tray, hold plate to light. If you can see through the half-tones or flesh, put back into the developer. Don't study your plate in dark

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room. When half-tones are dense and bone shadows permit but little light to pass, the development is complete. If your plate is very badly undertimed you cannot get such density, and will have to stop with opaque high lights and half opaque half-tones or flesh shadows. The hot water was to help you if development was slow or if dark room was cold in winter time. You can put your tray into the hot water, watching it carefully; if the developer gets warmer than 80° it will dissolve the frilled edges and the contained silver pigment (now black) will settle on the plate.

If you keep one hand out of hot water, you can tell by fingers in developer when it passes 75°, the danger point.

Isochromatic are many times as sensitive to red light as are other plates. No red light is perfectly safe. Hence, use your red light subdued, and if possible commence with none on plate. After image appears plates are not so sensitive, but do not hold up to light yet, because back of film is yet sensitive.

X-Ray plates are similar in emulsion to Isochromatic, and are less liable to be fogged in dark room. They cannot always be obtained, while Iso. plates are carried by all jobbing houses.

To recapitulate: Use Iso. or X-Ray plates. Use this specially adapted formula. Develop until flesh shadows are opaque to the viewing light; use temperature of 70° or higher, if required by undertime.

Hydrochinon	gr.	29
Sod. Sulph. (Sp. Gr. 1060)	oz.	1½
Pot. Brom. (10 per cent sol.)	dr.	1½
Pot. Carb. (Sp. Gr. 1060) q' s	oz.	IV.

or

Hydrochinon	gr.	29
Sod. Sulph. (dry)	gr.	XLV
Pot. Brom.	gr.	IX
Pot. Carb. (dry)	gr.	LXXXV
Water q. s. ad	oz.	IV

If you have to use crystals, the above quantities are as follows:

45 gr. Sod. Sulph. (dry = 90 gr. crystals.
85 gr. Pot. Carb. (dry) = 187 gr. crystals.

The presence of bromide always acts as a restrainer, allowing finally, however, full development in high light, with shadows left behind, which is desired in X-Ray work. This effect is immensely more marked when special plates are used. When such excessive quantities of bromide are used, it probably acts also as an intensifier, and may even take silver out of the shadows into solution whence it is stolen by the molecules in the high lights which are building up fiercely because of the strong developer.

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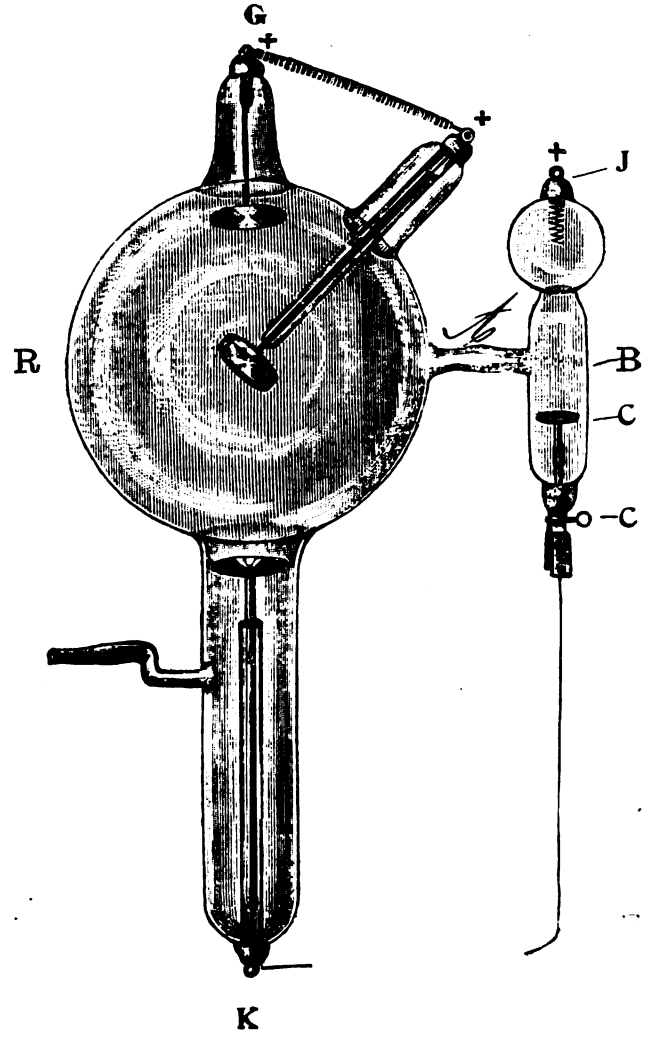
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Agreeably with the design of the *Era* in bringing to the notice of the medical practitioners every new design, plan and improvement relating to the electrical auxiliaries, we present herewith C. H. F. Müller's Universal Röntgen tube, of which the following is a comprehensive description:

Among the well-known anomalous conditions attending the Röntgen tubes which after some use become gradually too high in vacuum, is now successfully overcome by the addition to the principal tube R (see accompanying figure) of a short combination tube A to the auxiliary tube B, both directly intercommunicating with their vacuum spaces; the auxiliary tube containing a cathode C of some material, which as soon as the stream of electric force is allowed to flow in the given direction through B it will be found that a certain quantity of gas is evolved which at once reduces the endurance grade (or heightening of the tube). The transmission of the electric stream through the auxiliary tube may thus be effected by the



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brass rod E as attached to the C cathode adjustable by a swivel or thumb clasp, permitting same to approach the cathode K of the principal tube for the specific air cessation, and should be, if required, to examine pelvic structures from two to three inches, while for the taking of the hand but from one to one and one-half inches will suffice.

That the regulation of the current is proceeding categorically may at once be realized when the electric force as spark-streams readily overleap between K and E. If, however, the tube has become very high by too long and extensive use or undue long storage, the degree of high vacuum is readily reduced by means of this new auxiliary attachment and thus accelerate its operations by coupling the negative pole of the inductor direct with the eye of the lower end of the cathode C of the auxiliary tube, and thus permit the current to pass through with its full force. It is, however, advisable to begin with a moderate current as there may be danger in prematurely softening the tube; this procedure requires but from two to three seconds; after the regulating is effected the negative pole must naturally again be attached to the cathode K of the principal tube. If now the brass rod E is regulated accordingly as stated above, nevertheless the function and regulating procedure continues on while the tube is in action, i. e., as soon as there appears a disposition of the tube becoming higher there will immediately escape some sparks from K to E, thus the hardening degree will in this manner re-establish itself automatically and fix it again normally to its rightful vacuum.

It is therefore possible to undertake the most extensive examinations or expositions with this kind of tube which will fully maintain its uniform persistent vacuum. Aside from the first auxiliary device for reducing the high vacuum as described above, it has also another modus for heightening the tube which is necessarily of great use; not only can it be made higher after the tube has been abused, wrongfully applied, or too soft, but it can also be brought into requisition for the normal state, if f. i. an exposition of a hand had just been made and immediately thereafter it is required to make an examination of a pelvic part. In this case it is necessary to combine the positive induction wire (not as usually applied with the auxiliary anode G of the principal tube), but with the spiral formed electrode J of the auxiliary tube, but care should be taken that the brass rod does not come in contact with the cathode K.

If then the current is again directed in the same manner as before, it will show that the metal of the electrode J is vehemently thrown in fine atoms against the sides of the auxiliary glass globe B, thus forming now, by reason of its changed position, a part of the gas contents in both tubes. The time required for this combination depends entirely upon the degree of softness of the tube; if the tube is too soft and is needed to be very high, it requires about five minutes. The induction wire must now be attached from J to G and the tube is in order for the pelvic examination. It is self-evident that if in the transposition of the positive induction wire to J has not produced the essential result, that then this operation must be repeated, and, on the other hand, if the tube has become too hard through too long use that the first regulating auxiliary modus must again be resorted to.

The advantages of this regulating modus operandi comprise the following:

1. That the use of a flame is entirely abrogated and,
2. That the regulating device can be used in the simplest and most effective manner as an automatic regulator while the application is proceeding, and
3. That by reason of the addition of the auxiliary tube it recommends itself specially for long exposures as well as for exact impressions.
4. Most important of all advantages is the fact that the regulating elements contained in the auxiliary tube are so plentifully present that the longevity of the tube is thereby secured and with careful use should last a lifetime.

IMPORTANT CALL.

The subjoined call to the medical profession, issued by the committee heretofore appointed by the several heads of the electro-therapeutic schools and colleges in Chicago and their professors, is now being promulgated and is being signed by many prominent physicians and surgeons, who are desirous of promoting electro-therapeutics in its widest sense. Such a society, it is claimed, is highly expedient and must tend to vastly enrich the *materia medica*, and prove highly creditable to the projectors for their zeal and devotion to science.

Applications for membership may be sent to the office of THE ELECTRO-THERAPEUTIC AND X-RAY ERA, 1132 Masonic Temple.

TO THE MEDICAL PROFESSION:

The committee heretofore appointed by the respective electro-therapeutic schools and their professors in the medical colleges of Chicago, desirous of promoting the science of electro-therapeutics, respectfully invite the attention of the medical profession for the purpose of organizing the **Columbia Electro-Therapeutic Association,** which shall be composed of medical practitioners in good standing. Its principal aim shall be to hold monthly meetings at which theses, papers, reports of cases of treatment shall be read and discussed. That the society shall cultivate a fraternal regime and encourage a cordial interchange of opinion and principally the incoming science of electro-therapeutics. Your coöperation is herewith respectfully solicited. The preliminary meeting will take place at the Illinois School of Electro-Therapeutics, 1301-2-3 Champlain Building, on Tuesday evening, June 25th, at 8 o'clock, for the purpose of organizing and the election of officers. Respectfully submitted,

THE COMMITTEE.

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CORRESPONDENCE.

The "Era" courts correspondence and discussions upon topics relating to X-Ray Therapeutics, but does not endorse the opinions of authors.

Chicago, May 28, 1901.

Editor Era:

Believing that an organ such as is announced by you in the interest of free discussion relating to Electro-Therapeutics and X-Ray work, permit me to offer you the subjoined brief resume of my experience. I am aware that ever since the announcements of my theory and pioneer work in 1896 some of the medico-physical disciples and confrers have combated my postulates. I am still content that the then enunciated hypothesis are not only well grounded by scientific experiments, but are daily being verified by actual investigations and practical results. As stated by me in 1896 that X-Rays possessed therapeutical value, i. e., destroying culture, notably those of the bacilli of cholera, diphtheria, influenza, glander, pneumonia, typhoid, tuberculosis and anthrax, besides inoculating guinea pigs, rabbits, etc., with cultures which had failed to reproduce, while my laboratorical efforts were as careful as they were rigid. Imbued with the idea that the X-Ray possessed other and a more potent force, I placed under treatment several patients afflicted with cancer, tuberculosis and other infectious diseases; that I was rewarded with good results goes without saying, since I am gratefully thanked by the patients themselves, and as may be verified by my office records and the physicians who referred their cases.* Many practitioners and experimenters have been assiduous since then on utilizing this force not only in lupus vulgarus, cancer and kindred cutaneous diseases, nearly all of whom speak of this force and the notable effect on the tissues of the body. After a period of five years' close application and the treatment of many patients, I have studiously adhered to the application of this new force the X-Ray.

It has been my aim to establish the fact that this new force is simply an agent or element for producing electrolysis and to give a more comprehensive idea of this force I may restate my hypothesis based on "Electrolysis," "which is the disassociation of the elements of a compound by the aid of electrical energy." When a direct current is applied to the body, be it the galvanic, the static or X-Ray current, for the X-Ray is as much of a current as the others, electrolysis ensues, producing a continual disassociation and an association of the elements composing the body as long as the current is applied.

The stronger the current the greater number of ions are evolved and vice versa. Ions are the products of electrolysis. Those evolved at the anode or positive pole, or, on the surface of the body nearest the tube, are termed anions, and those evolved at the cathode or negative pole on the opposite side of the body away from the tube, are termed cations. During the process of electrolysis there is a disassociation and an association of the elements composing the body, along the lines of force.

There are two distinct forms of reaction produced, found in the polar and interpolar regions. The polar region is the region of the body that comes in contact with the poles or electrodes; or the surfaces of the body, the interpolar region, the region between the poles, or the surfaces of the body.

When the direct or X-Ray current is applied to the body, immediately electrolysis takes place, driving all the electro-positive elements or ions along the lines of force away from the positive pole or anode, or surface of the body nearest the X-Ray tube, to the cathode, which is on the opposite side of the body, and all of the electro-negative elements or ions away from the negative pole or cathode, or opposite side of the body to the anode in the direction of the tube, in other words, all of the electro-positive elements are repelled from the anode or surface of the body nearest the tube, but attracted to the cathode on the opposite side of the body away from the tube, and all the electro-negative elements are repelled from the cathode, or the surface of the body on the opposite side away from the tube, but attracted to the anode or surface of body nearest the tube.

Take sodium chloride, formula NaCl, and water, formula H 2 O; the chlorine and the oxygen being the electro-negative are repelled from the negative side, but attracted to the positive. The hydrogen atoms of the solution being electro-positive are repelled from the positive side, but attracted to the negative side of the body. The accumulations of the ions at the negative pole, side or cathode, called cations have an alkaline reaction while the anions are of acid reaction. The two poles or surfaces are sometimes known as the alkali and acid poles and if the current is sufficiently strong to produce vesication (which is the X-Ray burn) the effect of the local cautery at the negative is similar to that of an alkali (caustic potash), and the one at the anode similar to that of an acid (hydrochloric acid).

When an electrical current is applied to the human body it renders every portion of the body over which the lines of force pass (in the interpolar regions) aseptic. The current is antiseptic by virtue of the generation of ozone in the body, due to electrolysis. Ozone is the most powerful germicide known, and the integrity of the whole body is due to its presence (ozone is of neutral reaction). A sufficient amount of ozone in the human system will destroy all pathogenic microbes. In the polar regions we have two forms of action, which are purely local, having a varied effect on the pathogenic microbes. We find forms of microbes that will thrive in an acid medium, but will be destroyed in an alkaline medium, and vice versa.

*Some of these cases have been reported and published in Medical Journal in 1896-7.

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Any form of microbes that can be destroyed by aid of an acid can be destroyed with the positive pole of a galvanic battery; and those that require an alkali will succumb to the negative pole. Remember that the acid radical accumulates at the positive side and the alkaline radical at the negative.

The physiological effects of the anode and cathode on the tissues of the body are diametrically opposite. For instance: The ions found at the anode have an acid reaction, those at the cathode are alkaline. At the anode the circulation is diminished, at the cathode it is increased. At the anode the tissues are dehydrated; at the cathode they are hydrated. In both poles albumen is coagulated, at the cathode slightly, at the anode to an extreme degree. In the anode we have an acid cautery, in the cathode an alkaline one. The acids accumulating at the anode will destroy a large number of varieties of pathogenic microbes, while the alkalies accumulating at the cathode will destroy the rest.

The X-Ray is an electro-static phenomenon, an accumulation of lines of magnetic force of high potential and short wave length in a circuit. They decompose every substance capable of being decomposed in their path and render every substance over which they travel a conductor of electricity.

The X-Ray current, for it is as much of a current as any other electrical current, it corresponds and responds to the same law that governs any and all electrical phenomena and that the body is part of an electrical circuit, and that electrolysis ensues. This electrolytic action is simply a hastened normal physiological change. The surface of the body nearest the tube corresponds to the anode on the opposite side of the body away from the tube the cathode. The difference between the galvanic, the magnetic, the static and the X-Ray current is potential only, and in manner of production.

That I may claim priority for treating tuberculosis and other kindred maladies as far back as April 13, 1896, notwithstanding the carpings of some of my detracting confreres needs now no further comment. Dr. Röntgen of Würtzburg, Germany, was sufficiently outspoken regarding my exposition at that time. It is likewise true that recalled his dictum. But "truth crushed to the earth must rise again." The eminent doctor reiterated his first opinion and I am now resting upon the laurel. Satisfied that my humble theory is gradually being accepted by a large majority of my professional brethren.

It is hardly necessary to expatiate longer upon this theme.

The following dates are of the first patients treated by me with the X-Ray in 1896. The treatments began: April 13, 1896, cancer of the stomach; April 17, 1896, pulmonary tuberculosis; April 19, 1896, second case of pulmonary tuberculosis; May 3, 1896, third case of pulmonary tuberculosis. This last case was referred to me by Dr. Francis Dickinson and Dr. Effie Lobdell of Harvey Medical College. This patient was examined by Dr. William Harsha, Dr. Geo. F. Hawley, Dr. J. C. Spray, Dr. M. F. Sterling, Dr. J. E. Gilman and others of Chicago. On about June 1, 1896, Dr. J. A. Gilman began to refer patients to me suffering with tuberculosis, cancer, asthmatic and skin diseases. June 8, 1896, Dr. J. B. Murphy referred to me a patient suffering from lupus vulgarus. June 15, 1896, Dr. Finley Ellingwood referred to me a patient suffering from tuberculosis of the kidney.

H. P. PRATT, M. D., President.

Dr. Pratt's X-Ray and Electro-Therapeutical Laboratory, Chicago.

DR. GUSTAV EISEN'S RECOVERY FROM CANCER.

It will be gratifying news to learn that Dr. Eisen who believed that he had been inoculated with the parasitic bacilli of cancer, having been an assiduous bacteriologist, has just undergone an operation at St. Luke's Hospital, San Francisco, Cal., and it is confidently anticipated by the faculty of that hospital that this scientist will speedily recover and be relieved of this dread malady.

Dr. Eisen, in describing his examination of the various bacilli, bacteria and infectious germs as well as the pathology of the diseases affected by the germs. says: "Cancer is caused by an animal microbe known to science as an amoeba. The germ is not the same as that of consumption and cholera, the latter being vegetable growths, while the cancer germ is an animal growth, coming under the same head as those of malaria, yellow fever and smallpox. It is one of the lowest forms of animal life, of which any trace has been found.

"In shape the cancer microbe might be likened to an ideal money-bag, slightly elongated. The upper portion, where the strings would be tied around the bag, contains the mouth. Under the microscope the germs are shown to possess an internal organism, embracing a digestive apparatus.

"The microbe, entering the human body by what process we do not know, fastens upon the first cell which it encounters, and begins to feed upon and destroy the cell tissue. Having emptied one cell, it cuts its way out and attacks another. During its life the microbe duplicates itself thousands of times, and the home tenanted by the colony it thus founds constitutes a cancer."

If this theory, which is verified by the microscopic examination, and as has been successfully demonstrated that the X-Ray will destroy these germs as is being successfully applied by many progressive practitioners in all countries at this time it will be a grand step in materia medica as well as a divine blessing to humanity.

Nothing is opaque, replied a precocious youngster at an examination, because the X-Ray makes every object visible.

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PROSPECTUS

AT the earnest solicitation of many eminent medical practitioners and therapeutists, the undersigned publishers and technologists have concluded to issue **The Electro-Therapeutic and X-Ray Era,** a periodical which shall prove to be a welcome aid and auxiliary to the Medical and Surgical Profession generally.

The new auxiliary of the 20th Century will prove to be the grand panacea for suffering humanity by a more scientific and practical diagnosis of its injuries and diseases. To this end the publishers have placed themselves in communication with the leading and most celebrated X-Ray specialists of Europe and the United States, together with their principal hospitals and clinical institutions for obtaining the records of persons and patients treated. The X-RAY ERA will reproduce the designs of many tubes and their most recent improvements, and give to each a thorough and comprehensive description of their structure and application. Aside from this important information, it will give full details of all recent electrical appliances and kindred instruments. THE ERA will be strictly reliable in all its expositions, treating only of positive results obtained by expert practitioners, both of Europe and this country.

The publishers believe that you are interested in such a journal, and will deem it a favor to receive your earliest subscription thereto, being only $2.00 per annum. It will be artistically illustrated, containing from 16 to 20 pages of matter and clear typography, on substantial paper, and convenient for binding.

Respectfully,

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JULIUS SILVERSMITH, M. A., - - Editor.
R. FRIEDLANDER, - - Business Manager.

Copyrighted, both the title, as well as other contributions of a scientific character in each issue of the Era are copyrighted.

To be entered in the Chicago Post Office as second-class mail matter.

Subscriptions. The "Era" will comprise from 16 to 20 pages, 9 x 12 inches, on substantial paper with artistic illustrations, at Two Dollars per annum.

Editorial Management. The "Era" will be edited by Julius Silversmith, M. A., late of National Museum, Washington, D. C., and Armour Institute, Chicago; besides a corps of eminent medical practitioners, and more especially those engaged in Electro-Therapeutics will be prominent contributors.

Tube and Archive of X-Ray examinations, Clinical Record and the discussions had upon the theory and practice in all its spheres of applied X-Ray radiography, when concisely and comprehensively stated by letters and designs. Such correspondence is respectfully solicited and will receive special care and attention.

Advertisements and Business Announcements will be received and appropriately set up in modern typography at $150.00 per page, $80.00 half page, $50.00 quarter page per annum. For transient notices of monthly or single insertion, 50 cents per line. Seven words in agate type constitute a line, and may be addressed to the X-Ray Era, or R. Friedlander, Business Manager, No. 1132 Masonic Temple. All advertising is payable in advance.

The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

TO OUR CONTRIBUTORS.

One of the leading motives of the "Era" is to establish an organ which shall be open to the medical profession for discussing electro-therapeutic knowledge and recording their experience in their various spheres. The medical profession must realize that a friendly interchange of opinions and positive data in the research of therapeutics is not only highly advantageous, but a great boon to humanity.

Nor need the close curriculum of medical aesthetics be a barrier against specialists to be excluded from its columns or being heard, provided he keeps within a specific recital of his experience or discovery.

Theories or hypothesis which may be well-founded upon philosophy and as presented by expert testimony will of course be acceptable. A respectful discussion and controversy must in all cases revert to the certain and practical application to the afflicted.

The "Era" will unquestionably present all that is modern, novel and practical in the X-Ray, or Röntgen tube examinations, the electric appliances, photographic expositions, which latter auxiliaries are now becoming indispensable adjuncts in materia medica, surgery and the treatment of cutaneous diseases.

The medical profession will owe it themselves to participate in discussing and imparting their experience through the "Era."

X-RAY AS A PRECAUTION AGAINST INFECTIOUS DISEASES.

The most recent examination of X-Ray is as novel as it is prophilactic. Queen Helene of Italy has commissioned Princess Venasa to select some proper nurse for the prospective heir of the Italian dynasty. The princess has just returned from Albano, where the candidates were examined by a physician, a surgeon and an X-Ray specialist. After obtaining a history, state of health, family connections of the candidates they were subjected to an X-Ray examination. The successful candidate was also required to sign a stipulation that she will not hold any communication with her family for the period of two years.

An interesting case of incipient hypochondria has just been effectually dispelled by Dr. J. G. Message of Chicago, who reported that Miss Dora B. Peters of 34 Walton place, a healthy girl of eighteen years, had called at his office, stating that she believed that she suffered from heart disease. After a brief diagnosis the doctor concluded that her ailment was simply imaginary, and to convince her of his opinion he at once brought into requisition X-Ray auxiliary. A reflecting mirror was held by her which exhibited the natural pulsations of the heart for several minutes.

The young woman was convinced that she had no trouble, remarking to the doctor, "I guess after all it isn't my heart that bothers me." The X-Ray convinced her that her heart was in the right place and was beating quite normally.

What Dr. Selfridge of Oakland, California, says regarding X-Ray treatment of cancer:

The wonderful remedial power of the cathode or X-Ray has been demonstrated beyond question in Oakland in the case of Joseph Cairn Simpson, a well-known turf writer.

Distinguished surgeons had pronounced him to be suffering from a form of cancer and he had vainly applied many remedies before submitting himself to the X-Ray. After three months of daily treatment a complete cure is announced. Dr. J. M. Selfridge, the attending surgeon, was himself cured by the same means a short time ago.

"My theory is," said Dr. Selfridge, "that the X-Ray kills the molecules which constitute the primal cells where life actually begins. It frequently takes thousands of the molecules to make a single cell of the tissue. The deterioration or decay of these molecules, I judge, may cause cancer.

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"The X-Ray has the effect of drying up these atoms, and in time prevents the spread of cancer. Ultimately it kills the disease. I am positive when I say the X-ray can cure cancer."

THE SCIENCE OF X-RAY IN MATERIA MEDICA.

In a discourse before the Medical Congress, just held in McGill University, Montreal, Canada, by Prof. Wm. C. Peckham, the status of the Röntgen X-Rays as applied to locating foreign bodies in the tissues was dwelt upon with much emphasis, showing that by depicting such an anomalous body the surgeon is at once informed of the exact position and lead him to least incisions, while the setting of the bones and fractures may be accomplished with greater precisions and exactitude. The lecturer was quite felicitous in stating that as an auxiliary to pathology and diagnosis the X-Ray has become a valuable and unerring adjunct to the practitioner. He avers that many diseases may be stated even before the ordinary symptoms are heard or even seen. By the X-Ray picture the various calcide of the bladder, gall sac and the kidneys may be located, thus enabling the surgeon to operate upon the kidney with certainty. Consumption, even in its incipient stages, may be demonstrated and the condition of the lungs may be portrayed. An X-Ray photograph will show a cavity of the lung or a space filled with liquid, or an adhesion, while some practitioners go so far as to assert that such consumption in its early stages has been cured and the dread lupus has been destroyed by the direct application of the rays.

X-RAYS IN MALIGNANT RHEUMATISM.

M. Gerault of Paris, an eminent practitioner, has recently had under X-Ray treatment an employe of an electric appliance machine factory, who had been sorely afflicted with rheumatism. The malady had been of long standing and threatened to become chronic. The patient had been assigned to some special work in a room where a strong incandescent lamp was employed and so situated that the workman was in close proximity to the illuminating globe, so that the rays fell in a horizontal direction upon the employe. The patient soon discovered that a marked diminution of the pain was manifested in him. The employe reported this to his physician, who straightway had an apparatus constructed so that the light and rays of one or more strong incandescent lamps may be adjusted to patients suffering from this dread malady. It is stated that this treatment is now considered a positive and permanent cure. It is also announced that a statement of all cases thus treated will shortly be issued, which will give the history, pathology and therapeutical effects by this new means of electrical therapy of each patient treated.

Dr. Gerault, aside from the above evolved new application of electrical force, has also applied the same electrical illuminant to patients who had from one or another cause become deaf. In these cases he deemed the introduction of 50 c. p. lamps to the ear cavities, and for preventing the too heated globes of the inner tissues from burning, had provided translucent screens for arresting the heat. It is announced that many of the patients have been either cured or greatly relieved by Dr. Gerault.

A COMPLETE CURE BY X-RAY TREATMENT.

Among recent reports which reach us through the local press of Marion, Ill., is the following interesting case: On December 20, 1893, Mr. Fred Fatzler was caught between some cars at the Marion Manufacturing shops, and his attending physician, Dr. C. J. Miller, made the following report of his case: On the morning of December 20th I found Fred Fatzler fatally injured and laboring under great depression from shock, due to injury to the chest, abdomen, spinal cord and pelvis. Fracture of third, fourth and fifth ribs on the right side, the third rib separated at the sternal end and fracture at the center or shaft, with injury to the lungs, causing hemorrhage, which continued for six weeks; fracture of the fourth, fifth, sixth and seventh ribs, also a double inguinall, direct hernia and injury to testes; fracture of pelvis and four lumbar vertebra; separation of pubes and sacro-iliac articulations, and in his opinion the spinal column would never carry the weight of the body again. A similar report of disability was made and signed by Drs. L. D. Hamilton, John McMurray and Rhu, June 15, 1894.

The bowels, bladder and lower extremities were paralyzed, so that he could not tell when the bowels and bladder would move, and his limbs were entirely helpless. After three years the right leg was swollen, lifeless and without feeling. This necessitated his being carted about in a wheeled chair, and so hopeless was his case pronounced, that the insurance company paid off the policy on his life in order to give him aid.

After seven years of disappointment in the many remedies tried, Mr. Fatzler had a consultation with Dr. A. Rhu, who kindly interested himself in the case, and suggested a new mode of treatment with static electricity and soma-osmotine baths. On April 25, 1900, he received his first treatment and after eight treatments his bowels became regular, which had for so long given him untold annoyance, and thus he began to recover without the taking of medicine internally, and was finally restored by the aid of this treatment. March 1, 1901, he was at work in the Marion Manufacturing Company's shops.

CANCER AND ITS SUCCESSFUL TREATMENT WITH X-RAY APPLICATIONS.

Electro-physics is gradually forging to the fore and is making rapid strides in a therapeutical sense, which is destined to leave a creditable page in the history of the art of healing and materia medica, for which

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the twentieth century will stand sponsor as one of the grandest scientific achievements and panacea for the relief and restoration of persons afflicted with blood diseases and cutaneous affections which until now have baffled medical skill, and of which the inexorable records of necrology in all countries are evidence.

Through microscopy it has long been shown that nearly all abnormal conditions of the blood lead to many diseases, notably, cancer, eczema, etc., for which the materia medica has not yet fully accomplished a positive cure. The human blood when thus contaminated and examined will indubitably exhibit the bacilli, bacteria or poisonous germs which invariably attack the infected with the most virulent and ghastly results. The stigmas, blemishes and disfigurations are among the most loathsome reminiscenses. Until quite recently. X-Ray operations were extensively used for determining injuries to human bodies, such as broken limbs, gunshot wounds, dislocations, etc., and in this sphere the art and science of surgery has been almost providentially aided and enriched.

Physicists have now taken a step farther with their tests and unerring experiments to apply X-Rays in a therapeutical direction. Their discovery of the destruction of bacilli and parasitic animalculies by means of X-Rays is now so well grounded that all practitioners, whether of one or the other schools of medicine, must avail themselves of the appliances for treating their patients, and rid them of such ravaging diseases. We write of this new scientific achievement with no uncertain terms. The reports of eminent physicians and medical practitioners, of which our issue contains authentic data, will establish the value of X-Ray treatment of cutaneous diseases, which, when intelligently applied with the most approved auxiliaries, such as electric transmitters, Röntgen tubes or X-Rays appliances, will henceforth obviate the use of scalpel, excoriation or anti-toxine medicaments.

It will be a gratifying and divine blessing, both to the afflicted and the medical attendant, that this new therapeutic system must at once become of general use. The medical profession who are prone to twentieth century advancements in all spheres of science and philosophy may well hail the auspicious advent of the X-Ray panacea.

The Am. Jour. of Surgery and Gynec. advises that if some cotton wool be saturated with peroxide of hydrogen plaster of Paris bandages may be easily removed with no injury to the patient or any trouble whatever.

A certain remedy against bites of poisonous reptiles will be found in taking nitrate of potassa. A teaspoonful suffices for a child and tablespoonful for an adult; it should be pulverized and taken in a glass of cold water, besides applying it to the bite.

Messrs. Drs. Schiff and Freund, two well-known experts of Vienna, in summarizing their labors with X-Ray treatment, showed that thirteen cases had been treated by Röntgen rays, consisting of four of favus, four lupus vulgaris, three sycosis, one of erythematous and three of hypertrichosis.

Munich Med. Wochenschrift announces that the two eminent medical practitioners, Hahn and Albers-Schönberg, declare that 30 per cent of lupus and other skin diseases under their care were either entirely cured or greatly improved. The eczematous and thickened condition of the skin that accompanies lupus disappears completely, and large surfaces can be treated at the same time. Favus and sycosis are also readily cured.

JULY ISSUE.

We are pleased to announce that among Chicago's most eminent X-Ray therapeutists and general practitioners who have kindly tendered THE ERA their services for important articles on various topics, and more especially their experience in X-Ray therapeutics, are namely: Dr. C. S. Neiswanger, Dr. G. G. Burdick, Dr. Wm. Allen Pusey, Dr. F. H. Blackmarr, Dr. Emil H. Grubbe, and others.

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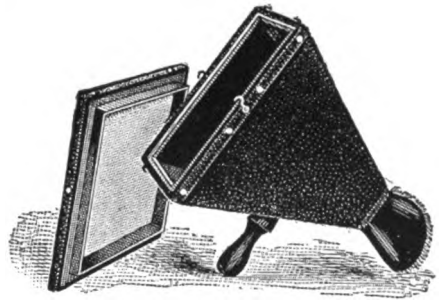
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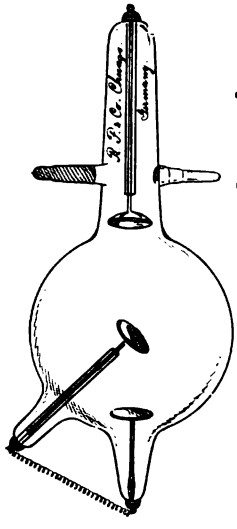
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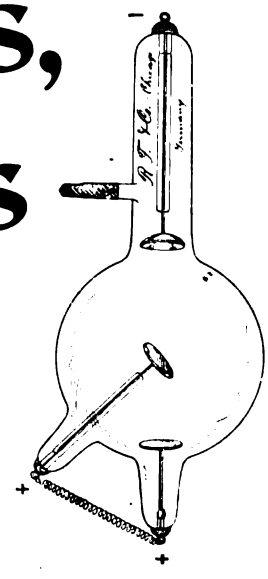
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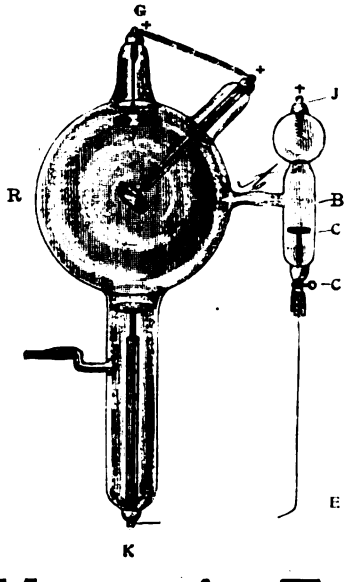


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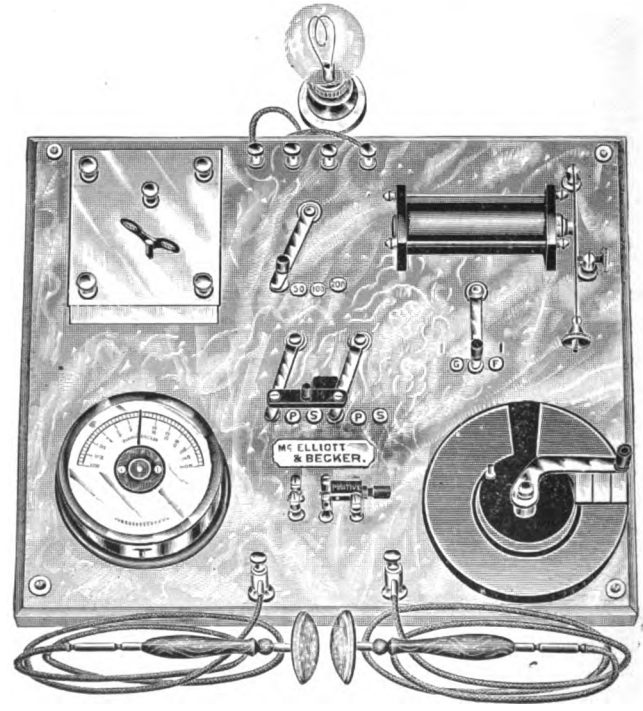
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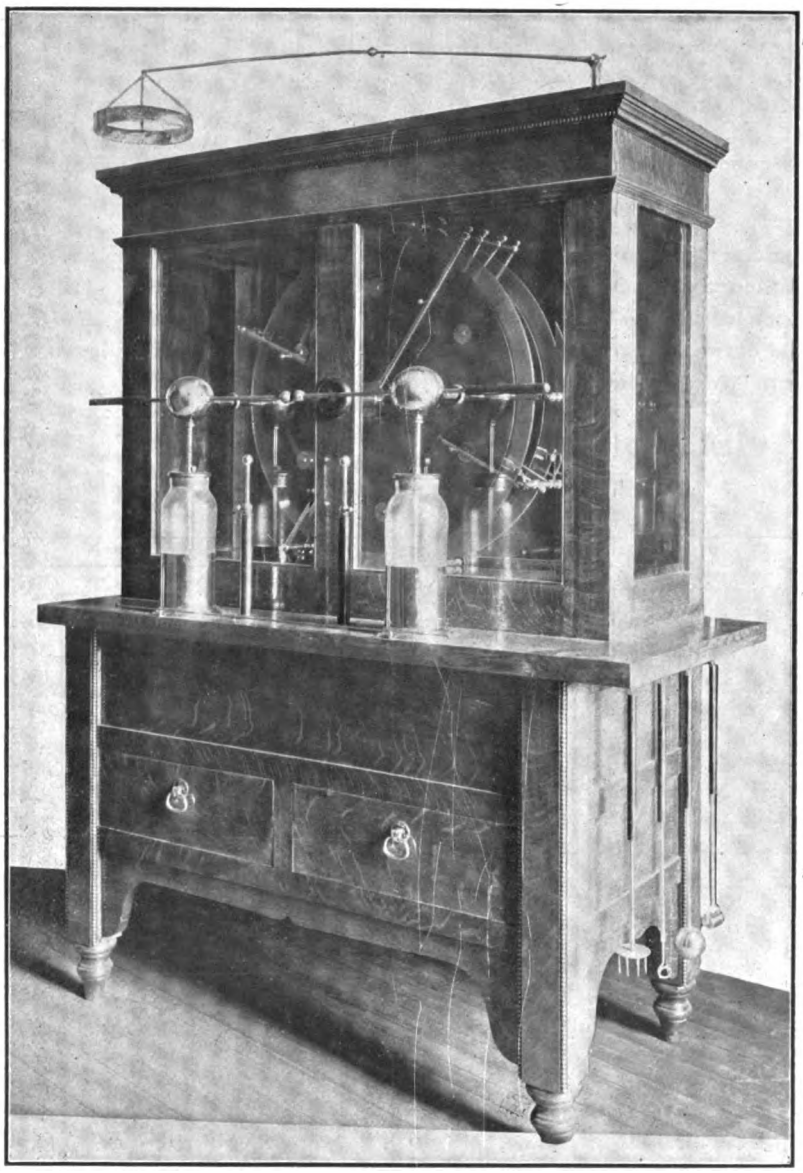
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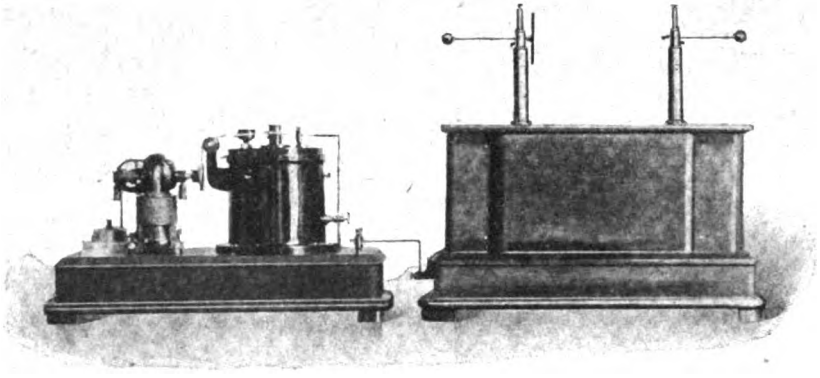
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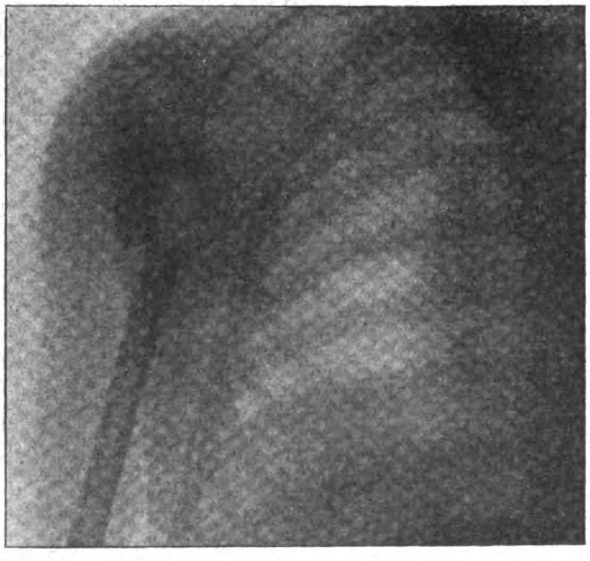
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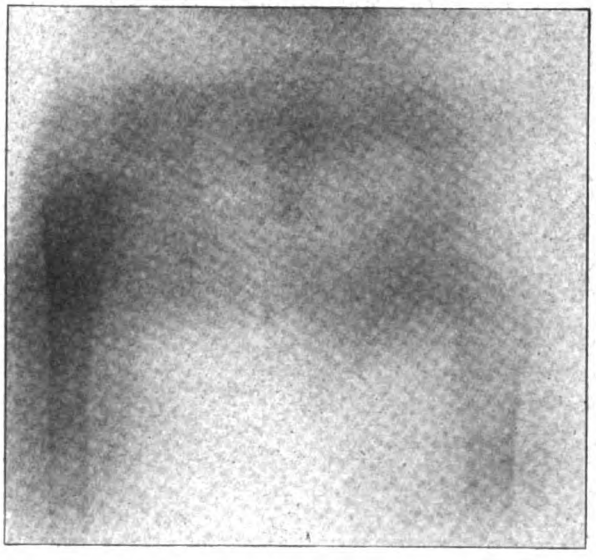
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VOL. 1. CHICAGO, JULY 15, 1901. No. 2.

(Special to the American Electro-Therapeutic and X-Ray Era)

THE SO-CALLED "INACCURACIES AND FALLACIES OF THE X-RAY."

BY EMIL H. GRUBBE, B. S., M. D.,

Professor of Electro-Physics, Radiography and X-Ray Diagnosis Illinois School of Eletro-Therapeutics; Lecturer on Electro-Therapeutics Hah. Medical College and Hospital; Chief Radiographer Illinois X-Ray and Electro-Therapeutic Laboratory. Member Roentgen Society of the United States, also Electro-Medical Society of Chicago, etc.

It has been said that the use of the X-ray is insufficiently understood by the majority of non-professional people. I believe this to be the case, but I hazard the opinion that also a great many very active professional persons have an exceedingly inefficient understanding of the real value of the X-ray when properly used.

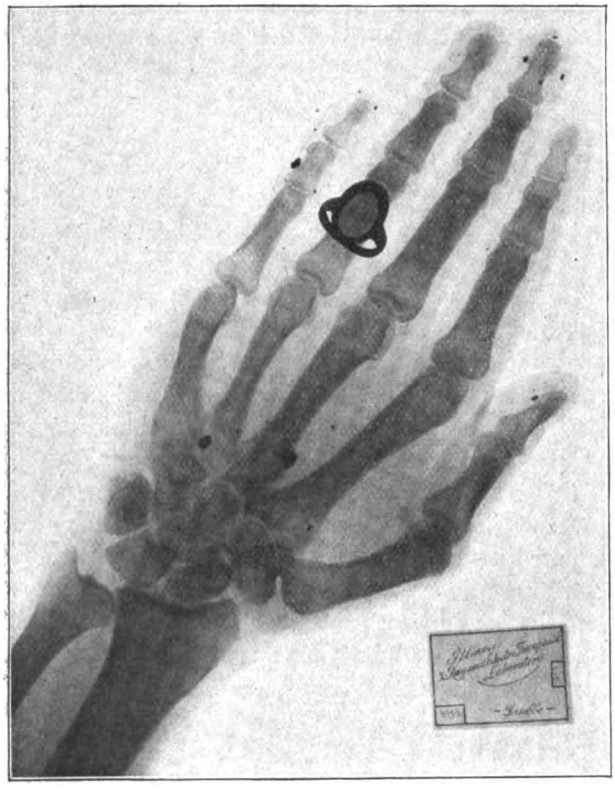


Fig. 1.

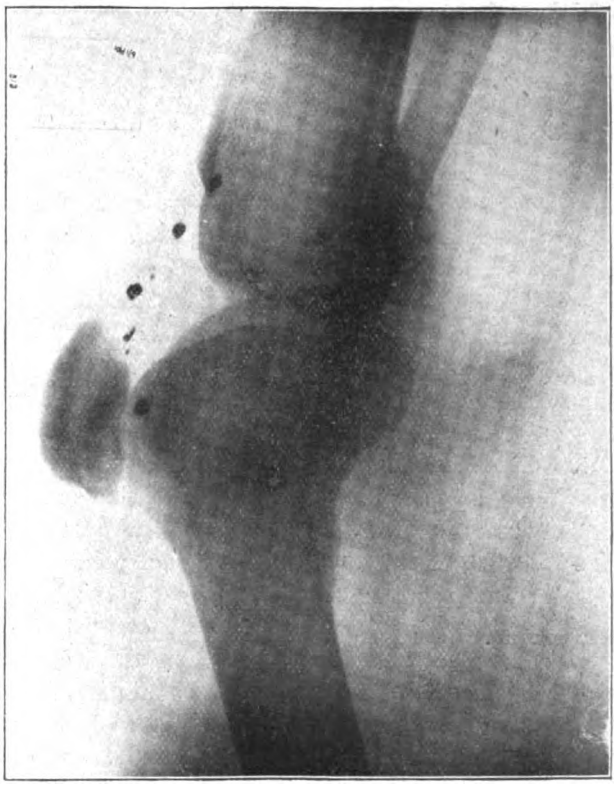


Fig. 2.

At the outset it must be understood that our sources of X-rays are exceedingly complex. Therefore we should not expect a person unacquainted with the sciences of electricity and medicine to get good results, simply because he chooses to supply himself with an outfit with which to work in this line. We need perfect mechanical and scientific training, in order to make a good radiograph, and, moreover, we must be practical physicians in order that we may be able to correctly interpret radiographs.

The science of radiography should certainly not be held responsible for the mistakes and shortcomings of indiscriminate and ignorant radiographers who work with inefficient apparatus and are unfamiliar with the subject—mere novices. These same doctors would not undertake to perform an amputation without having previously studied the subject, yet they make efforts to take radiographs and know not what they do. The impossible may happen, but it is not probable.

If the X-ray is inaccurate it is our own fault and not that of the science, as many writers would lead us to believe. These writers rush into print and dare to write upon a subject of which they do not even know the primary principles. They exhibit pictures which never deserve the name because they show nothing—are simply blotches on paper and therefore have no

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value. We have had such an abundant crop of these that it is time to put a stop to them. Some of these articles have been inspired by a deliberate purpose to propagate certain theories, but in the main they are the result of ignorance.

In this connection I believe as Dr. Heber Robarts has aptly said, "That a physician has no professional or human right to discuss the inaccuracies of the X-ray unless he understands its accuracies. If he only knew the evil effects of morphine he would do well to let the drug alone and the entire profession of medicine."

What, then, is required to make a good radiograph?

To begin with, it is, or ought to be, a well-known fact that a great many different factors must be taken into consideration when we wish to make a good and true radiograph. We need first an electric current of sufficient high voltage and amperage to properly excite a Crooke's vacuum tube, and, in order to take care of the great variety of objects and parts presented for radiographing, we must be able to vary both voltage and amperage at will. I wish to place emphasis upon the latter part of the preceding sentence.

We need next to pay our attention to the vacuum of the tube. I believe experience will bear me out when I say that those radiographers who make good pictures understand their tubes well; know what degree of vacuum is necessary for a certain part; what time to give for the exposure and the distance at which the tube must be placed from the body.

Personally I should say a proper understanding of the vacuum of a tube is of the greatest advantage and will do much toward removing the ferment of excitement pertaining to inaccuracies of the X-rays. If the tube is placed too near the body some distortion is bound to occur, and it seems to me a great many have failed to produce clear and distinct pictures because of the failure to observe this fact. It must be remembered that practically all the illuminated hemisphere of the excited Crooke's tube is throwing off rays and many of these are not at all times parallel or in a direct line with the body radiographed, and, unless we overcome this by placing the tube some distance away, distortion of the shadow on the plate must occur.

The position of the body X-rayed must also be ideal, and in cases of suspected fracture or foreign body, scientific method and instruments of precision are necessary to produce accurate results in a radiograph.

Next we come to the subject of development of the plate. Experience teaches that the best pictures are made from plates which have been developed by the radiographer himself. If you must send your plates to a photographer, you ought not to expect good pictures, because you have nothing to guide you in the future, and consequently you work blindly. As a rule most photographers develop plates mechanically. They possess no knowledge of the chemistry of photography, and therefore are unable to overcome the many difficulties which arise, and poor pictures are the rule and not the exception. When an operator develops his own plates he can tell when he has made a mistake, he makes note of the length of time of exposure, the vacuum of the tube used and the current consumed, and future exposures are regulated accordingly. Manipulative skill derived from long practice, plus a knowledge of the chemical principles underlying photography, are necessary to get results. Considering this one subject alone, any person of ordinary intelligence can readily see how important is a proper understanding of the chemical development of the plate, for here the strictest attention must be paid to details, as slight deviation may produce dubious results. So that what we call inaccuracies of the X-ray should be called inaccuracies of personal work due to a vague knowledge of the business.

I am almost daily in receipt of letters from physicians who wish to know the formulas which I use in my work. Of course, there are no definite lines to draw. The personal equation enters here very largely, and one person may succeed with certain formulas while others, using the very same solutions, cannot duplicate the work. We must remember that all the conditions—the body, the current, tube vacuum, time of exposure, distance of plate from tube, developer, developing time, etc.—must be exactly the same to duplicate any radiographic work. There is no royal road to success in this line; experimentation and diligent work only will determine the method most suitable. Each method which may be recommended has its own special advantages and disadvantages.

Of late we read articles in the medical press written by carping critics, who, according to their knowledge exhibited in their writings, either do not read to keep up with the times, or cannot understand when they do read. It is amusing to those who have little difficulty in making good radiographs to read almost weekly that the value of the X-ray has been over-estimated in this or that direction. On the contrary, if these writers who have failed, not because of the fault of the X-ray, but because of lack of ability, actually saw good radiographs they would have to admit that the value of the X-ray had been under-estimated, and indeed could be considered indispensable in very many cases.

A short time ago an article appeared in a medical journal purporting to give special attention to original investigation along X-ray subjects with illustrations. Even one most ignorant of X-ray methods on reading this article would put the author down as one who neither knew how to write nor was able to do original research work if he tried. Such persons make veritable asses of themselves when they launch out upon

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the sea of authorship, and write upon a subject of which they know nothing. The possession of an X-ray outfit does not necessarily make good radiographs.

Basing my conclusions on my own experience and on reports gleaned from the extensive literature on this subject, I venture to say that the reluctance of the average physician to give the X-ray full credit must be explained entirely from the standpoint of inexperience of such writers. And thus is raised the cry of X-ray fallacies, inaccuracies and misinterpretations.

I maintain that the X-ray is a positive means of diagnosis, providing in the first place you are intelligent enough to apply it, and in the second place are able to correctly interpret the resulting radiograph, for which a knowledge of anatomy and pathology are indispensable. Even with these preparations it must be admitted that there are failures with the X-ray. But there are failures also with other diagnostic agents —nothing is infallible. Was there ever a physician who never made a wrong prescription, or a surgeon who never made a wrong diagnosis or a wrong cut?

The sum and substance of all this means that we must have specialists in this work, for otherwise we shall always be in the dark. Physicians buy outfits knowing little or nothing about the physics of mechanics or electricity. How can we expect results? A person who knows very little about electricity should not expect to make correct radiographs any more than he could interpret heart sounds with a stethescope before he took a medical course. The unfitness of the general practitioner to do the best X-ray work without special knowledge of electricity and electrical apparatus is shown by the number of articles of a contradictory nature which appear from time to time. I predict that ultimately X-ray work will be done only by specialists. The specialist in this line of work differs from the general practitioner who uses an X-ray apparatus occasionally, because, being a specialist, he devotes his whole time to this particular subject. He makes many exposures, has more complete apparatus and unlimited experience with a great variety of conditions, consequently he gets more uniform and accurate results. He standardizes his knowledge and develops a technique which only long experience can give.

During the past few years the profession has been more or less carried away by the X-ray method of diagnosing, and unscrupulous persons have entered the field and brought discredit upon the whole subject, which it certainly does not deserve, and it is a deplorable fact that the importance of the X-ray has not yet been realized by the profession at large.

I do not wish this paper to be considered personal, neither is it intended to elicit any unpleasantness among the profession. I only care to present a side of the subject which, to my notion, has not been dealt with.

I trust that I do not expose myself to the charge of egotism when I present with this article two pictures to illustrate what detail and definition we can get if we use correct methods.

In conclusion let me say, in order that the calamitous cry of the fallacies, inaccuracies and misinterpretations of the X-ray may become a thing of the past, that I plead for more care in the selection of apparatus and proper working of the same if the physician must do his own radiographing and picture making; and above all I plead for more enthusiastic support of the specialists, who are physicians and practical electricians, and who give their whole time to this subject, who make proper application of experience, and who are, therefore, able to correctly interpret the radiographs which they make. Then we shall find nothing more accurate in diagnostic medicine than the X-ray.

819 Champlain Bldg., 126 State St.

(Special to the American Electro-Therapeutic and X-Ray Era.)

RADIOTHERAPHY IN TUBERCULOSIS.

By Gordon G. Burdick,
Associate Professor of Surgery, Post-Graduate of Medical School.

It is with extreme reluctance that I am induced to report on my experience with the use of radiotherapy in tuberculosis, because my experiments are not far enough advanced to become conclusive; and the fear that a very promising method of treatment in this terrible disease may be done to death before the fundamental principles are sufficiently understood to insure success. From out of the general chaos of knowledge about the ray one fact stands out preeminently, and that is the fact that the Roentgen ray will arrest tuberculosis in organic tissue.

Another fact should not be forgotten, and that is that the ray will kill organic tissue if not used with extreme care; and the borderland between its medicinal power and its destructive action is so narrow that a very fine discrimination is necessary in its application to receive its full value and not its destructive action.

It should not be forgotten that we are dealing with a force that is little known, and one that requires great skill in its use and very efficient apparatus in order to prevent doing harm to our patients if we decide to use the ray in the treatment of disease. The enormous number of so-called burns reported all over the country would go far to indicate that good judgment is the thing that seems to be wanting. I have made over 3,000 exposures and have never had any trouble as yet, and that seems to be the experience of all men who have made it a hard study.

It is a fact that certain low tubes will invariably cause irritation, and they are almost invariably found among the cheaper class. Generators that are irregu-

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lar in their action will develop the dangerous ray, and great care is necessary in their selection. It should not be forgotten that the Roentgen ray is an intense ray from the chemical end of the spectrum, which exists in the solar spectrum in small quantities, and by artificial means is produced and intensified a million times by our method of generation and made available for practical use.

This can be proven by anybody that cares to take the trouble by constructing a large condensing lens and fill its center with a violet solution, when, on exposure of a plate wrapped into light proof holders, it will be found that a very satisfactory radiograph can be made at the focus of the lens. A prolonged exposure is necessary to obtain success.

We have not succeeded as yet in devising any reliable means of measuring the intensity of the ray, but it seems that shortly a satisfactory means will be found; the ray has the same action on selenium as light, and clumsy attempts have been made to measure its strength by using the Wheetstone bridge and measuring the electrical resistance of the metal while it is exposed to the ray. The principal difficulty so far has been the temperature factor and the expense of the apparatus, to say nothing of the skill required to use it properly.

A few facts are known definitely in regard to the Roentgen ray:

1. That it travels in straight lines.
2. That it passes through most substances.
3. That it passes through a complex substance, according to density of its component parts.
4. That it causes a chemical change in its passage through susceptible substances.
5. That it is destructive of organic life if used long enough.
6. That it is an efficient antiseptic in the presence of an organic substance.
7. That it has pronounced analgesic properties.
8. That certain salts will absorb it and fluoresce.
9. That it will decompose certain salts.

My attention was first called to the possibilities of its use in tuberculosis three years ago by the relief that was found by the patient on making a radiograph of a tubercular knee joint. I made an exposure of ten minutes with the inefficient apparatus then in use, and got a good negative, but the surgeon wished a different view and I repeated the exposure four days later. The patient claimed that he had the first relief from pain he had experienced for many months. Two weeks afterward he came back and begged for another exposure, and after a consultation it was refused. The subsequent history will be found later on.

This case set me to experimenting on a few cases of tubercular joints that came to my clinic, and I found that one injection of iodoform emulsion and subsequent treatment with the ray usually was followed by immediate improvement and a subsequent recovery. It might be mentioned in passing that iodoform fluoresces beautifully under the ray.

A bad case of pulmonary tuberculosis presented itself at this time. He had been under treatment for a number of months at the clinic, and was getting so weak that it was only with the greatest difficulty that he could get to the hospital. And he was very anxious to have a radiograph taken of his lung, and to humor him I took it; and he came back and asked me to use it again, as he had felt better than he had for some time. I had him come twice per week and take treatments, not expecting it would do him any good. No special change was noted until he had taken six treatments, when his cough left him and his temperature became normal. When he took his tenth treatment he reported that he had gained twelve pounds in weight and had been working for a week: the subsequent history will be found in the report of the case.

I will report briefly a few of the cases that I have treated with the ray. They are fairly representative of the whole number of 13 cases of pulmonary and five cases of joint tuberculosis that I have submitted to the ray treatment. It is of interest to say that they are all enjoying good health at present and pursuing their various vocations as if they had not suffered from the dread disease. As yet no relapses have been noted, but are being carefully looked for and will be promptly treated if noted.

Case 1. John M., age 26, single. Met with an accident July 10, 1896, by falling off a wagon, and as he went to work the next day he apparently did not meet with an injury. Aug. 20, 1896, he found that his knee joint seemed to be weak and he had difficulty in using it, and it grew steadily worse until he could not bear his weight upon it. The joint became swollen and painful on pressure, and a marked atrophy was noticed of the muscles. He consulted an eminent surgeon and a diagnosis of tuberculosis was made and he was advised to have iodoform injected into the joint. He submitted to eight injections without stopping the process, and then had the leg put up in the plaster for four months; and when it was removed it was so bad that an amputation or an excision was advised, and he was sent to me to determine by means of a radiograph, which would be advisable.

Two radiographs were taken of the joint four days apart, and the exposure was ten minutes each time with the apparatus then in use; and the patient claimed so much relief that he begged for further exposures, and after a consultation with the surgeon it was refused. It is interesting to know that the patient did not receive any more treatment of any kind, but recovered the use of his joint in about four months and at the same time his health and is working every day driving a team.

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Case 2. Wm. F., age 28, married, pulmonary tuberculosis. Had been under treatment for four months and was steadily growing worse. Temperature 101-5, severe cough, sputa contained tubercle bacilli and streptococci; he had night sweats and a profuse diarrhœa. Treatment was given at his request and with no hope of success. Treatment was given twice a week with a very high medicinal vacuum tube. No special improvement was noticed for four weeks, when he began to slowly improve and gain in weight, slept better, sputa lessened in amount and became more liquid and contained less bacilli, and the fever gradually left him, until at the end of ten weeks he was discharged; and although a few bacilli are found occasionally, as far as can be told he is in good health and working every day.

Case 3. Margarette L., age 24, widow, one child, poorly nourished. Developed pulmonary tuberculosis five months previous to consulting me, when I was called to see her for a severe hemorrhage from the lung. Both lungs were involved and the bacilli tuberculosis were found in great quantities. She was so feeble and exhausted that it did not seem that there was even a remote possibility that she could recover. It took two weeks of careful nursing to bring back strength to allow her to ride to my office for treatments. And the first two calls were made in a cab. She subsequently came on the street cars, as she improved. After six treatments I put her on tonics, when the improvement was rapid. She increased in weight from 93 pounds to 118, the most she ever weighed.

She has resumed her place as a waitress in a restaurant and works twelve hours per day and has been doing it for months. I have been able to find tubercle bacilli only twice in the last year.

The above cases are a fair sample of the rest that I have treated. I don't claim that they are cured by removing all the bacilli from their systems, but I do claim that they have regained their normal health.

No one is in a position at present to say just what takes place in the human tissue during the passage of the ray, and as yet we have only some plausible theories to offer and which are given for just what they are worth.

Theory 1 assumes that the tubercle bacilli are of less vitality than the human tissue, and the actual death of the germ takes place.

Theory 2, that the passage of the ray through the tissue brings about a chemical change that arrests the growth of the germ, but not necessarily causes its death.

Theory 3, tonic effect, by stimulating the normal cells to increased activity.

Theory 4, that the passage of the ray produces electrolysis and causes the tissue to become acid or alkaline as desired. I am very much in favor of the second theory, as it is a fact that tubercle bacilli may be occasionally found after the patient has apparently recovered.

In conclusion I would again repeat the warning about overdoing the thing, if you decide to try this treatment, as I am positive that you will have occasion to regret if you are reckless; and don't expect to find many medicinal tubes among the cheap kinds that are sold with the apparatus today, or you will be disappointed. Burns are usually produced by low vacuum tubes, and carefully looking over the literature I find that it takes about forty minutes' exposure to produce one that is of any consequence, and any physician that finds it necessary to make an exposure of that length had better devote his time to other channels, as he will never succeed as a radiographer.

3000 Michigan Ave.

(Special to the American Electro-Therapeutic and X-Ray Era.)

X-RAY DIAGNOSIS FOR RENAL CALCULI.

By Dr. Byron Robinson.

I wish to add my testimony to the great value of the X-ray in the diagnosis of renal calculi. Every surgeon knows how uncertain the diagnosis on this disease is by ordinary means. In fact, the operation on the kidney amounts to an experimental exploratory and confirmatory incision; besides, the surgeon should have some record for protection when an operation is performed on the same. To test the efficiency of the X-ray on renal calculi I recently diagnosed this disease in four consecutive patients, and subsequently sent them to my colleague, Dr. H. P. Pratt, for confirmation by an X-ray before operation. In the four cases the X-ray showed renal calculi, and the operation proved it to be true in every case.

I can highly recommend the X-ray as an aid to diagnosis in renal calculi. I believe as the X-ray becomes more thoroughly perfected and the interpretation of shadows better understood that it will be an excellent aid to diagnosis in this disease.

Chicago, July 15, 1901.

We have the doctor's promise of a larger paper on this subject, with illustrative cuts, in the near future.

NOTICE.

The next meeting of the Chicago Electro-Medical Society will be held on Tuesday evening, July 30, at 8 o'clock p. m. at the Balcony Clubroom of the Palmer House. The society extends invitation to the medical profession, urging their attendance. We hope that the profession will readily respond to this request, especially as a paper will be read, entitled "Electro Diagnosis," by the president of the society, the eminent Dr. S. V. Clevenger. Discussion to follow.

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(Special to the American Electro-Therapeutic and X-Ray Era.)

WHAT IS MEANT BY A HARD OR SOFT X-RAY TUBE.

By Dr. H. P. Pratt.

There has been a good deal published in the scientific journals about the hard and soft X-ray tube, and I question very much that not many of the readers understood these terms.

The hard and soft tube is the same as a high and low vacuum tube. It must not be forgotten that the X-rays are produced by the bombardment of the molecules of residual gas against the inner surface of the tube. The number of molecules or residual gas in the tube determine the degree of vacuum, as to whether it is a hard or soft tube.

The X-ray when excited acts in a similar manner to a condensor or leyden jar. It discharges in one direction, the outer surface of the tube becomes electro-positive, while the inner surface is electro-negative.

The tubes as a rule are excited from the terminals of the Ruhmkorff coil or the static machine. It is the secondary current which excites the tubes. The current is established through the medium of the molecules of the residual gas in the tube, thereby connecting the cathode with the anode. Each oscillation in this circuit causes the molecules of residual gas to bombard the inner surface of the tube, which point of impact is the source of the X-ray.

When the tube is excited some of the molecules of the residual gas are thrown from the cathode side of the tube, striking the platinum disc or anode, which serves as a target, causing the molecules to rebound, striking the inner surface of the tube. This point of impact on the inner surface of the tube, as I said before, is the source of the X-ray. Every molecule of gas striking the inner surface of the tube causes one or more lines of magnetic force to be thrown out with each impact at right angles to the surface of the tube. The distance in which the lines of force are projected, or, in other words, the limit of the penetrating power of the ray, depends entirely on the potential of the tube, and this in turn depends on the force of impact of the individual molecules of gas. The higher the vacuum the less the number of molecules of residual gas in the tube, the greater the free path, the higher the potential the greater the penetrating power. The lower the vacuum, the greater the number of molecules, the less the free path, the lower the potential, the less the penetrating power.

All substances over which the X-ray passes form part of the X-ray circuit.

The X-ray circuit is the same as any other electrical circuit. It has its return, forming an endless chain of molecules arranged in series. The higher the potential the greater number of molecules added to the chain, the larger the chain and vice versa.

The circuit is formed first from the point of impact on the inner surface of the tube, being directed outward until the potential drops, then returning to the tube through the terminals.

Remember the X-ray is electro-static in character, an accumulation of lines of magnetic force of high potential and short wave lengths in a circuit, they decompose every substance capable of being decomposed in their path, and render every substance over which they travel a conductor of electricity.

The light which is emitted from the tube is the result of the decomposition of the molecules in the atmosphere surrounding and inside of the tube. This light is not the X-ray current. The X-ray force is purely electrical and is invisible.

The softer the tube (limited) the greater number of lines of force are thrown out and the stronger the X-ray current, which increases decomposition.

The harder the tube the less number of lines of force thrown out, and consequently the weaker the X-ray current the less the decomposition.

For good therapeutic effects use soft tube, increase and decrease primary current to suit the case, but be careful to avoid X-ray burns. The ordinary hard tube will not burn.

Dr. Straeter, Germany, asks: What part do the tubes play in the therapeutic treatment of disease with X-rays?

The doctor has found a great difference in the action of the X-rays upon the skin as to whether a soft or a high vacuum tube was used; for instance, in the use of a soft tube the exposed skin would become reddened after a few treatments—that is, reaction would take place; while in using the high-vacuum tube the reaction would either appear after a great many exposures or not at all. Accordingly, whatever pathological process, whether in regard to the epidermis or deeper laying disease is to be treated, it is necessary to have the proper vacuum of the tube. In epidermis a soft vacuum tube, for deeper action a medium vacuum tube should be used. Extremely high vacuum tubes are not good for any treatment.—(Deutsche Med. Wochenschrift, 1901, No. 34.)

Our editor says: Our own experience bears out the theory of Dr. Straeter. It goes without saying that the construction of the tube, and mainly its vacuum, is a most important factor in X-ray treatments of diseases. There is no doubt in our own mind that the effect of the vacuum upon the treated parts, needs more careful study and development.

The Roentgen Society of London recently offered a prize of a gold medal to the manufacturer of the best X-ray tube. International competition was invited. All tubes to be delivered May 1, 1901.

We are just informed that the above prize was awarded to Mr. Mueller of Hamburg.

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Personal Letter to the Medical Profession

Dear Doctor:

In the beginning of any new enterprise, there is of necessity a large outlay of expenses before the enterprise becomes self-sustaining, and especially is this true of New Publications that are in special lines, such as this of the "AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA," that ministers directly to the wants of the Medical Profession, consequently we feel justified in making a personal appeal for immediate subscription, and we base our appeal upon the stringency of our Postal Laws in regard to rates and definition of what is marked as "SECOND CLASS MATTER." To secure "Second Class Rates," we can not mail or even print more than double the number of regular subscribers. We print 10,000 copies, consequently need 5,000 subscribers to secure such rating; will you not kindly fill out the subscription blank attached, at once, and so give us the aid we need? With the growing interest in Electro-Therapeutics and X-Ray work everywhere manifest among Physicans, we feel that you need the "American Electro-Therapeutic and X-Ray Era," and we believe that you yourself feel the need of such a publication in order that you may be kept informed of the progress that is being made on this line, both in this country and in Europe, and only need this little reminder to comply with our request, and so aid us, that we may better aid you.

Respectfully yours,

American Electro-Therapeutic and X-Ray Era,

R. Friedlander, Pub.

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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

TO OUR READERS.

In ancient mythology "Jove, the Father of Gods," was represented as holding in his hands the thunder bolts. This symbolism becomes freighted with significance in this new age of scientific discovery; for have we not discovered that electricity is the one primal element of all physical structure; its various phenomena appearing in all the manifestation of physics?

But in this connection I recall the saying of an ancient philosopher that "We must kill every god that we would make useful to us." I would, however, amend that saying by saying that we must subdue all the gods, (principles of nature), and having yoked them to the car of progress, make them our servants.

We all know of some of the electrical discoveries of the age, now in its dawning, as motor power, in telegraphy and such as these; but, too, do we not recognize everywhere in Electro-therapeutics and X-ray treatment the constantly increasing interest of the medical profession? This interest is world-wide in its extent, and is by no means a "fad," to have only an ephemeral life; but is instead destined to remain, and, remaining, grow still more intense as the age develops, as all ages do, the ideas born to it.

With this thought in mind I take my place as editor of the American Electro-Therapeutic and X-Ray Era, hoping to add my mite to the efforts of others in this work thrust upon us of "subduing the gods," knowing well that if I succeed in this to my own satisfaction I must have the thoughtful aid of the medical profession everywhere. And I hope and believe that this aid will be given as freely as I have asked it; for the interest is a mutual one—we must work all together if we subdue Jove!

Fraternally yours,
J. O. M. HEWITT.

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue.

MEDICAL SOCIETIES.

Kindly instruct your secretaries to inform us of your respective meetings, and furnish us with special items of interest to the profession.

THERAPEUTIC VALUE OF THE X-RAY IN TREATMENT OF CUTANEOUS DISEASES.

Dr. Hahn of the Institute of Alber, Schoenberg & Hahn, Hamburg, in his paper read before the medical society of Hamburg in November, 1900, stated that there was an increasing interest in the treatment of skin diseases by the use of the X-Ray; and introduced for their examination some of the patients who had been so treated.

In Dr. Hahn's statement of effects he placed in the foreground of this interest Lupus; but added that at the finish if the healing process did not advance as desired, he would use the Finsen's method (high light) if the patient had time for the slower process.

He also claimed to have treated with good results Eczema, Psoriasis Vulgaris, Lupus-erythematosus, Rosacea, Favus, Sycosis and Hypertrichosis. He stated that "it goes without saying" that the treatment is alike beneficial for both acute and chronic eczema. The doctor demonstrated on a case of eczema in a young lady of seventeen who had suffered from it in malignant form since earliest childhood, satisfactorily proving a complete cure as the result of the X-Ray treatments. These diseases respond quickly to the Roentgen rays, particularly in the suppression after one or two treatments, of the itching that is the accompaniment of eczema.

Psoriasis plagues were equally benefited, he stated,

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by the X-Ray treatment, the scales dropping off at from four to six exposures without the characteristic bleeding.

Of Lupus Erythematosus he reported three cases. Of these two cases were positively cured; of the third he could only report apparent good results while treatment was continued, but the patient went away and the case was lost sight of.

In two cases of Rosacea, the cures were at least long-lasting, if not complete, as there had been so far no return of efflorescence upon the skin In cases of reddening of the nose, the X-Ray seemed to destroy the germs at once. He said the triumphs of the X-Ray treatment have been marked in all diseases of the skin which, as a rule, accompany hair diseases, remarking that to cure the first it was necessary to remove the hair. In X-Ray treatment of Favus, Sycasis Parasitaria and Sycosis Nonparasitaria and Hypertrichosis he had obtained good results. Speaking at length, he remarked, that in the two cases of Favus mentioned, compared with cases otherwise treated, the preference was decidedly in favor of the X-Ray. In a case of Sycosis Parasitaria, in which positive cure was effected by the X-Ray treatment, the doctor stated, that after a few exposures the swellings the size of walnuts fell off, the hair disappeared and the inflammation went back, affection disappearing with the healing of the slight burning caused by the X-Ray. In the cases of Sycosis mentioned excellent results followed, though they had been persistent for from two to twenty years. In the specially demonstrated case, the affection had been existing for six years. The hairs were sticking in the inflamed follicles on both cheeks, chin and upper lip; the main parts between were red and infiltered. After twenty-three treatments with the X-Ray an excoriation of the chin about the size of a nickel appeared, but quickly yielded to emollients applied. After the cure of the excoriation, the chin and cheeks appeared in an entirely normal state, though the upper lip remained slightly reddened. The epulotic results are unfailing and cure can be guaranteed.

Speaking of electrolysis for the removal of superfluous hairs and small moles, he said that while this might be done, with single hairs, yet where large spaces were to be treated it is entirely out of question, as the frequent treatments that were necessary to effect a cure causes a nervousness undesirable, to say nothing of the fear excited in the patient, caused by the pain following the connection of the current in electrolysis. And besides, while destroying the single hair, it increases the growth of the hairs surrounding. He then called attention to the fact that by that method there was always left a scar, while in the X-ray treatment there is no pain, and no danger, provided the reaction receives proper attention or is prevented; while it has also the merit of covering large spaces at once.

In the growth of hair, which occurs in from two to four months, the recidivation becomes less and less, until finally they will not grow again; the skin stays smooth and no scars or observable change appears.

It will be seen by our readers that the experiments of Dr. Hahn, as above narrated, are of practical value; and if not as exhaustive as we could wish, yet are to us hints to be followed, as we for ourselves would make scientific advancement. This the physician of today realizes as a necessity of his profession; and, too, the physician of America is by no means a mere follower of his European brethren; he has the skill and the nerve to go forward, and already is competitor for the honors of discovery and practical application of methods whereby best results are obtained. Yet by no means do we of America fail to give honor to whom honor is due and extend to Dr. Hahn our greeting of praise.

Doctor Baurath of Berlin, writes to us: "Gentlemen, I am very favorably impressed with the first issue of your journal. It covers a much wanted field and will give us of Europe a better opportunity to hear from our American colleagues. I will forward to you as soon as possible an article regarding my own experience in X-ray work. I furthermore assure you that I will take great pleasure in soliciting valuable articles from the most eminent physicians on the continent. I wish you good success for the future.

The fact that electricity with its almost endless molecules changes, is the physical basis of nature's phenomena, presents to the intelligent physician. no less than to the scientists in other lines of special work, subject for earnest thought and investigations in respect to its therapeutical value in treatment of disease, yet strangely, it seems until within the last few years to have received but comparatively little attention from the medical profession, though it has been in use in a kind of empirical way many years. As a rule, it has been left to those, not physicians; but who by one way and another have discovered that in some cases good results have obtained from its application, and these "good results" have been exploited, while the ill results, owing to the ignorance of the operators, have been suffered to go unheralded and so unknown. But gradually electro-therapeutics has come to be regarded as a science, and as such is appropriate study of all who would be thoroughly equipped for their life work as physicians. In other words, the intelligent "up to date" physician feels that he must not be empirical only; feels that he must know the thing he uses; and too, that he must with his science, supplant the ignorant one; and see to it that the public is protected from the malpractice of ignorance. What is needed therefore, is some medical journal of repute, where from month to month, cases may be cited and detailed descrip-

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tions given, and especially as we now perceive the therapeutical value of the X-ray as well as that we have found its value in the diagnosis of disease. To give this information, and from the most celebrated physicians we have issued the American Electro-Therapeutic and X-Ray Era, and we feel that with our extensive correspondence both in this country and in Europe, we are prepared to supply this now felt need, and we believe that in our efforts we will serve not only ourselves, but the whole medical profession, and through these, mankind.

CHICAGO ELECTRO-MEDICAL SOCIETY.

The efforts of this magazine to secure the formation of an electro-medical society to promote the careful and thorough investigation of electro-therapuetics and X-ray uses therein have been crowned with success, as is indicated by the following paper giving official report of the formation of such society. Our readers will also notice that the organization has made the American Electro-Therapeutic and X-Ray Era the official organ of the society:

Official Report of the Meeting.

Pursuant to a call, issued for the purpose of forming a society for the advancement of scientific electricity as a medical agent, a number of the doctors of the city, among whom we mention Drs. S. V. Clevenger, G. G. Burdick, Emil H. Grubbe, A. W. Baer, H. P. Pratt and Richard H. Street, did convene on Tuesday evening, June 25, 1901, at 8:30 o'clock, in the office of the Illinois School of Electro-Therapeutics, 1302 Champlain Building, Chicago, Ill.

The meeting was called to order by S. V. Clevenger. On motion Richard H. Street was appointed secretary of the meeting. On motion the chairman appointed the following committee—Drs. Burdick, Baer and Pratt—to formulate a plan of action. The committee reported that the officers of the society should consist of a president, two vice-presidents, a treasurer and a secretary; also an executive committee of five members, publication committee of three members, committee of scientific research of five members, and a membership committee of three members. On motion the following officers were elected to act until the annual meeting:

S. V. Clevenger, president.
J. E. Farnum, first vice-president.
J. E. Gilman, second vice-president.
G. G. Burdick, treasurer.
Richard H. Street, secretary.

Motion by president that the society be known as the Chicago Electro-Medical Society. Carried. Motion made and carried that the date for the annual meeting be Tuesday, December 3, 1901. Motion that the first regular meeting of the Chicago Electro-Medical Society be held Tuesday, July 30, at 8 o'clock at the Palmer House. Moved that Dr. Clevenger be requested to read a paper at that meeting. Dr. Clevenger accepted and promised the society a paper on Electro-Diagnosis. Moved that the secretary be instructed to send a notice of this meeting to the editors of the Journal of the American Medical Association, Chicago Medical Times, the Clinique, Chicago Medical Recorder and the American Electro-Therapeutic and X-Ray Era. Motion by Mr. E. H. Grubbe that the American Electro-Therapeutic and X-Ray Era be made the official paper of the society. Carried.

On motion the meeting adjourned.

RICHARD H. STREET, Secretary.

Dr. Stenbeck of Stockholm has not only treated lupus with X-ray, but also cancrite. The first case of this dreadful disease was a very deep-lying epitheliom of the nose, while the second was a common typical cancrite in the shape of an E.

The treatment with the X-rays took place every day, and judging from the photographs shown to demonstrate the cases the results were very good.—(Fortschritte auf dem Gebiete der Rontgenstrahlen.)

The success achieved in the treatment of some diseases by the high frequency, or chemical, rays of the electric arc light is attracting the attention of many persons in various parts of the world.

Experiments have demonstrated, it is said, that the rays destroy, among other things, the bacilli of tuberculosis and cause dilatation of the capillaries, with corresponding changes and increased nutritive activity.

Some of these experiments in phototherapy, especially those made by Dr. Neils R. Finsen of Copenhagen, have aroused wide-spread comment. He is the inventor of the tube which bears his name. In New York a number of physicians are using the Finsen tube and other apparatus for the purpose of treating certain diseases.

In the Finsen light department of the London Hospital the number of cases treated each day is about one hundred. Queen Alexandra was instrumental, it is said, in having this method of treating certain diseases tested in the London Hospital.

Among the hundreds of cases of freak hands or feet which have been discovered and recorded by Professor Frederick Star of the Anthropology department of the University of Chicago are fifty minute descriptions of Chicagoans who have either too many or too few fingers and toes. Professor Starr made another appeal to the members of his class for the names and addresses of people with superfluous members. He announced that it was his purpose to get full data upon 500 cases and then he would begin to formulate a new theory. Already he has records for 350 cases, some of the subjects having six,

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seven and even nine fingers or toes on one extremity. Among the observations which he has already made is one to the effect that such deformities are more common in large than in small families.

DISCOVERY OF A NEW DISEASE AND THE MICROBES PRODUCING IT.

Honor to an American Physician.

The French Academie de Medicine has just paid an American doctor the greatest compliment in its power. Dr. C. J. Koenig, formerly of San Francisco, who has become widely known as a specialist in throat and nose diseases in Paris, has been asked to communicate to the academy at tomorrow's session the details of his double discovery of a new kind of sore throat and of the microbe that produces it.

Dr. Koenig, who will respond to the honor conferred on him by giving the academy the whole fruit of his labors, furnished an account of the discovery.

"The patient who was the indirect cause of my discovery," he said, "was a man 35 years of age and in perfect health, with the exception of being subject to chronic rheumatism. The trouble began two months ago with a form of superficial ulceration, covered with a grayish false membrane in the upper part of the right tonsil. The only symptom was a slight pain in swallowing. There was no fever, no headache and no gastro-intestinal ailment.

"In spite of all treatment the affection spread to the mouth in the form of superficial erosion, covered again with false membrane, which invaded the palate, the cheeks and even the tongue.

"After many weeks of close study and investigation I discovered a bacillus to which I have given the name 'bacillus polymorphus' on account of the remarkable variations in its size and shape.

"It is immobile, differing from all other baccili in cultural properties and susceptibility to colorations by aniline dyes. It is non-pathogenic, since guinea pigs do not die when hypodermically injected with the culture."

The new disease has been given the name, "Eroso Membraneus Angina." The medical profession of Paris is manifesting the greatest interest in the exposition of the subject.

Since writing the above we find this item in the daily press:

Chicago Doctors Doubt the New Disease from Paris.

"Eroso membraneous angina," the new throat trouble which Dr. Koenig, late of San Francisco, says that he discovered in Paris, is not alarming the physicians of Chicago appreciably. Dr. Koenig says that an entirely new variety of germ, which he has named "Bacillus polymorphous," causes the disease. It appears that "eroso membraneous angina" is gravely suspected of being an old friend, pharyngo-mycosis, masquerading under an alias.

Dr. Arnold C. Klebs, the throat specialist, 147 Lincoln Park boulevard, Chicago, said he had never heard of Dr. Koenig, adding: The disease described in the interview does not show any extraordinary new features. To judge from the description it may well have been a pharyngo-mycosis, a rare local disease, though well recognized. The non-pathogenic germ Dr. Koenig claims to have found may have nothing to do with the disease."

Dr. Adolph Gehrman, the city bacteriologist, said the new disease might well be pharyngo-mycosis. Until the germ shall be proved to be pathogenic, or disease-causing against the human frame, it cannot be reckoned important as a discovery, said Dr. Gehrman, who also had never heard of Dr. Koenig.

Dr. H. S. Gaylord of the University of Buffalo states that cancer is caused by an animal parasite which has been identified and isolated. He has been investigating the cause of cancer for two years as head of the New York State Pathological Laboratory. He has inoculated animals with cancer germs, and cancer afterward developed in the animals. Cultures of these organisms have been injected in the abdominal cavities of other animals and they recovered, having apparently grown in the serum of the animal.

Experiments with X-Ray have proven that the cancer parasite has been successfully treated by the Roentgen Ray and marks the beginning of a new era in combating this dread disease.

At the request of Dr. L. K. Hunter, one of our representatives called at his office to be shown a new device in lighting a miniature lamp with static electric current, which up to the present time electricians have considered impossible. The doctor has experimented for some time along this line, and finally succeeded in accomplishing the desired result. He attaches two terminals of a small box (the inner construction of which as yet is his secret) to the static machine and the other two to the lamp, when the static machine is put in action the little lamp lights up with the usual brilliancy.

The doctor thinks this construction of sufficient value to have applied for patent rights.

In the August number of this Magazine there will appear an article from F. H. Blackmarr, M. D., on Lupus Vulgaris, which, we believe, will be of special interest to the profession.

Doctors—Please do not forget to send us your subscription for the American Electro-Therapeutic and X-Ray Era.

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G. E. Fosburg, M. D., of Cedar Rapids, Iowa, says: Your journal is quite a fit of X-ray work. Will send you some interesting literature if desirable.

Doctor, we thank you for your compliment, and would be glad to receive your communications at your earliest convenience.

E. A. Florentine, M. D., treasurer of the Roentgen Society of the United States, Saginaw, Mich., says: I am pleased with the first issue of your monthly and wish you much success in the future.

A. B. Slater, secretary and treasurer of the Illinois School of Electro Therapeutics, says: We are in receipt of inquiries daily regarding articles in the American Electro-Therapeutic and X-Ray Era. This shows that the Era, not only reaches, but attracts, the attention of physicians interested in our field of therapeutic research. As an advertising medium it is A No. 1.

Frank S. Betz & Co., 37 Randolph St., Chicago, say: Last month we placed our first advertisement in this journal and from the number of replies we received it shows that the doctors know a good thing when they see it, for letters come in from every state in the Union from physicians who want information regarding the little ad in the American Electro-Therapeutic and X-Ray Era.

H. C. Bennett, M. D., of Lima, O., says: We have received your initial number of your new journal, which we have examined with interest, and we congratulate you upon its appearance, and wish you all success, and welcome your journal to the field of electro-therapeutics, which needs a few more good publications along this line.

Professor Koch of Berlin, the discoverer of the phthisis bacillus, will startle the medical and scientific world by the announcement that bovine tuberculosis cannot be transmitted to the human system.

The famous bacteriologist, authorized the statement that he has demonstrated that the meat and milk of cattle infected with tuberculosis may be consumed with absolute impunity.

He says: "I have reached the conclusion that mankind's fear of contact with tuberculosis-infected flesh and fluid is unnecessary and unfounded.

"I arrived at the discovery through what I consider practically indisputable tests. These experiments lead me to believe that human tuberculosis and bovine tuberculosis are two entirely distinct species.

"I have found the human tuberculon incapable of inoculation into the animal system. Proceeding from that premise, I am prepared to show that humanity's far-reaching precautions against infected cattle may once for all be abandoned."

HENRY M. SELIGMAN

ATTORNEY AT LAW

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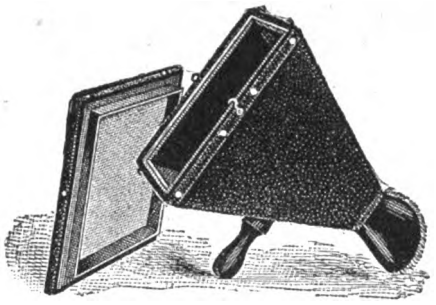
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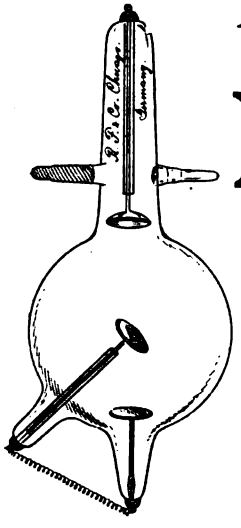
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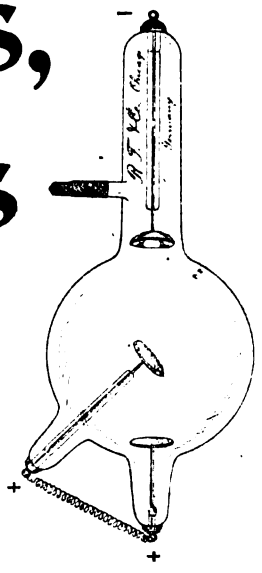
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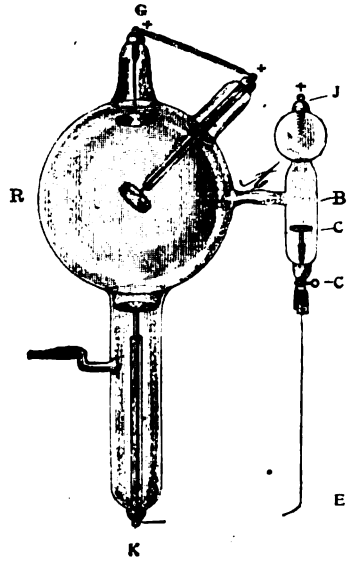


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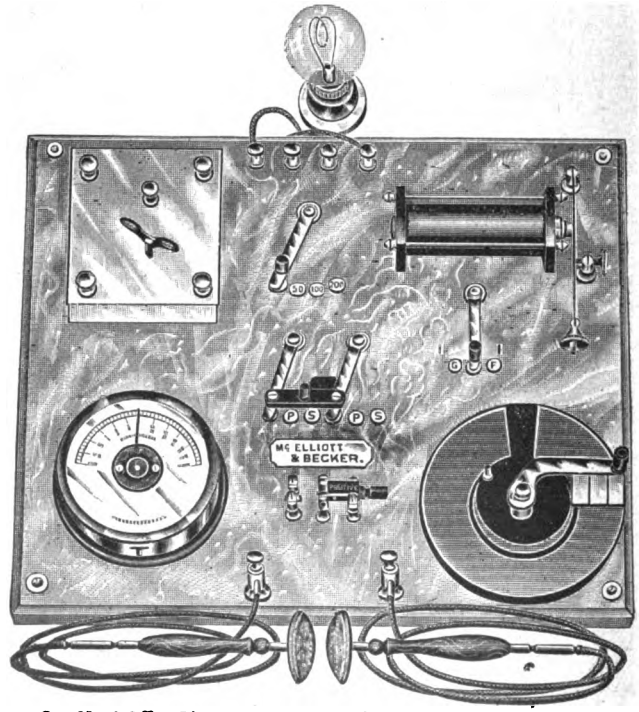
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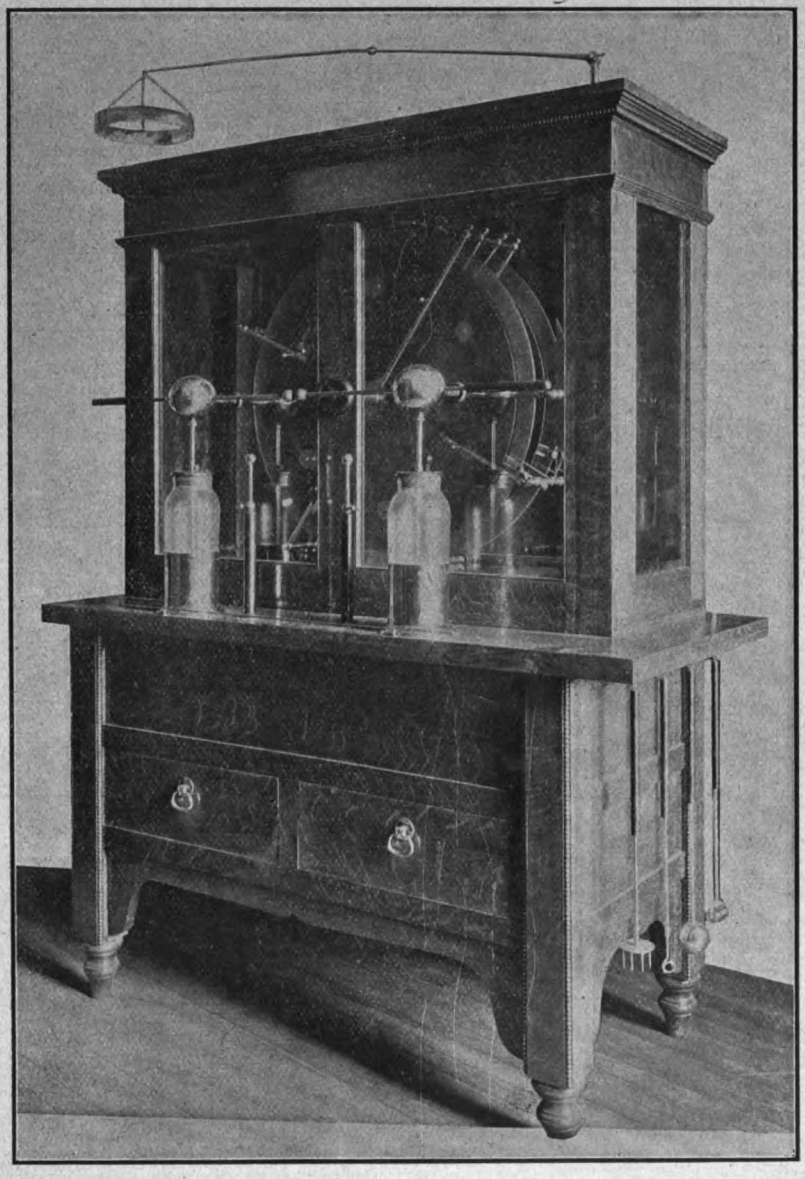
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VOL. I August 15, 1901 No. 3

AMERICAN ELECTRO-THERAPEUTIC



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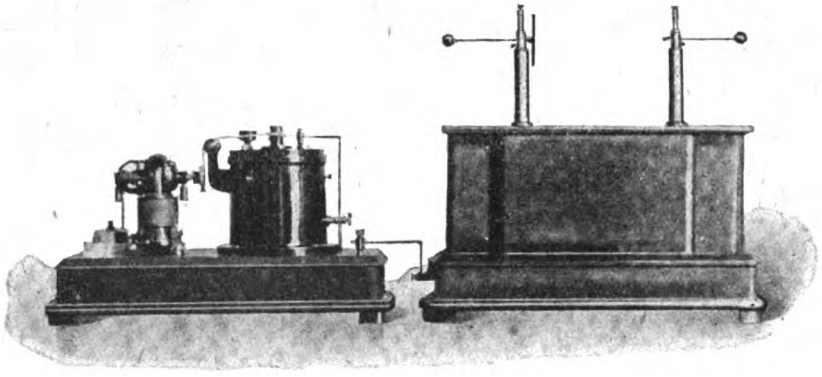
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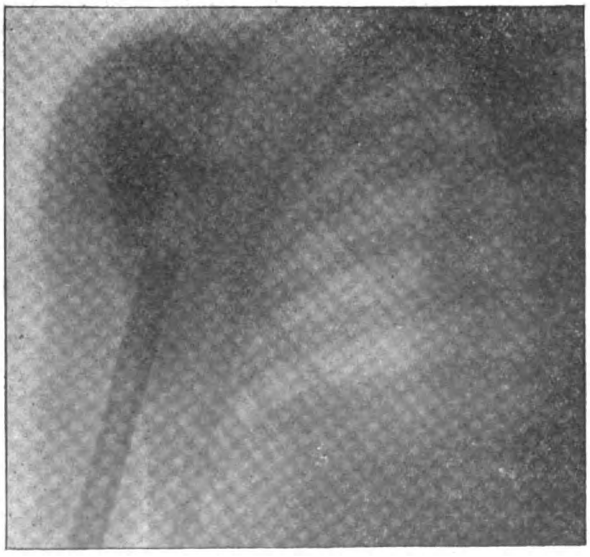
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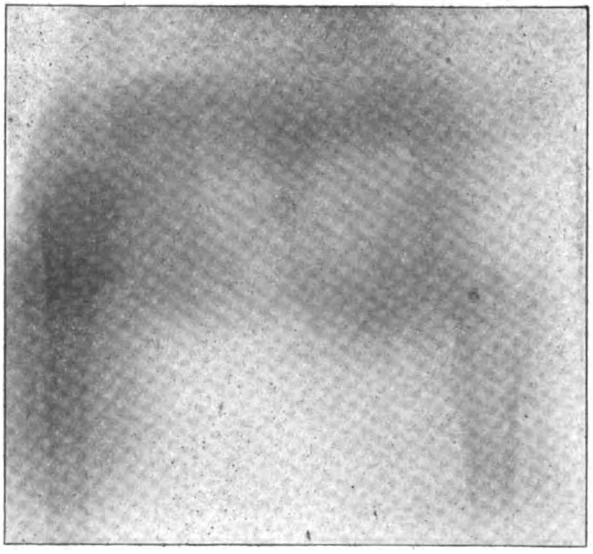
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A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. 1. CHICAGO, AUGUST 15, 1901. No. 3.

(Special for American Electro-Therapeutic and X-Ray Era.)

LUPUS AND ITS POSITIVE CURE.

By FRANK H. BLACKMARR, B. S. M. D.

Formerly Professor of Electro-Therapeutics, Hahnemann Medical College; President Edison College of Electro-Therapeutics.

One definition or description of Lupus Vulgaris and Lupus Erythematosus will not characterize, in any detail, both of these diseases, save that they are both chronic and consist of granulation tissue.

The pathological condition and causative factors of each are entirely different.

Lupus Erythematosus is a rare disease (the cause unknown), most common in females of adult life, attacking most frequently superficial areas of the face and nose. It is preceded by erythema of the parts, and the sebaceous glands are particularly involved.



It appears as bright reddish spots about the size of pin heads, which coalesce from their peripheries and form round or oval patches with sharply defined borders. In the lupus area, from time to time, we shall discover white or colorless patches, which, covered with whitish or adherent scales, may cause us to think that a cure is being wrought. In fact, the whole area has been known to disappear suddenly, but al ıost always to return. One authority calls attention to this fact and advises that no operative means ever be used with this kind of lupus, because if the disease disappears there will be no scar tissue as a result.

It seems to me, from a consideration of the authorities upon the subject—in view of the fact that the disease almost always returns after spontaneous cure—that the surgeon or physician (before the discovery of the therapeutic value of the X-rays) would have been perfectly justified in using the best method known—viz., scarification.

Concerning the cure of Lupus Erythematosus by the X-ray, I can say that it does positively cure the disease. Sufficient time having elapsed since the treatment and recovery of cases to convince me that they are permanently cured.

The case recorded below I give as one of the most obstinate yet treated.

LUPUS ERYTHEMATOSUS.

Mrs. G., wife of physician, 43 years of age, excellent physique, always well nourished, says that she never was ill beyond having a few headaches. Eight



years ago several red spots appearing upon the left cheek; thought nothing about them until after a month, when they became darker and began to coalesce and other points appear. Her husband began to think it strange that this slight eruption was so stubborn. After a second month it dawned upon him that this rare disease was lupus. He used green soap, oxide of zinc ointment, sulphur ointment, salicylic acid, pyrogallic acid, medicated collodion—in fact, all medical means available, but with indifferent results. Frequently the center of the now single area would become thinner and lose its color, encouraging them in the belief that it would soon heal. But a return of all that she had gone through was the result. Before the year was over the patient was put in the hands of

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a New York specialist, with indifferent results. Upon returning home in '92, her husband sacrificed the surface, using an oxide of zinc dressing. After six months the old area had enlarged to almost twice the size before scarification, being fully three inches in diameter.

Two years ago ('98) she went to Vienna and underwent, practically, the same treatment, but all improvement was lost after three months.

April 1, 1900, I had the pleasure of having the patient under treatment of the X-rays.

Obtaining the thinnest sheet lead, I pounded out a mask, by means of wooden tools and sand bag, to exactly fit her face, leaving an opening a trifle larger than the lupus area itself.

With the patient I used high frequency coil and medium vacuum tube. The treatment lasted for a period of fifteen days, beginning with twenty minutes, twice daily for three days, ten minutes twice daily for six days, five minutes daily for three days, three minutes daily for following three days. She remained in Chicago for nearly one week after that, so that I might watch the already slightly developed dermatitis or X-ray burn. At no time was the burn severe. She returned home with a very little color over the lupus area, which was left from the burn, and it was thinner, cleaner and in better condition than after the first scarification. One week after her return home, word was received that her face had entirely healed—nothing remaining to be seen except a few little scars, probably the result of the scarification. Four months have now intervened, and her letter of July 28 states: "I was never better, and my face is certainly well."



LUPUS VULGARIS.

It is universally known that this form of Lupus is caused by the bacillus of tuberculosis. By Wolf it is called tubercular scrofulide.

It is a disease of the true skin, the derma, attacking the face and extremities, and it may involve cartilage, mucus and fibrous structures. Its victims are found from infancy to puberty. The disease first appears as brownish, painless, hard points, which gradually enlarge, forming tubercles, and may or may not aggregate to form patches. When developed toward ulceration—"lupus exedens"—the tubercles become soft and pulpy, frequently described as "apple jelly" tubercles. They form illy defined ulcers, partially covered with scabs, and which eventually discharge foul and sanious pus. Under this condition, ulceration gradually involving structure after structure. When healed there is left behind a yellowish cicatrical tissue of uneven thickness.

In the now ulcerated lupus vulgaris the elevation remains for a long period of time, then disappears, leaving behind a small cicatrix, or it may remain permanently.

The medical treatment, and likewise the surgical treatment, of this disease has been entirely unsatisfactory as far as the cure is concerned.

Mrs. H., 38 years of age, weight 101 pounds, height 5 feet 5 inches, illy nourished, coughs a great deal; examination of lungs, roughened inspiration over whole area of left lung, few moist rales, sputum not examined. Six years ago was in fair health. Slight hard pin point elevations appeared upon the middle of left cheek, gradually increasing in size with tendency to aggregate and coalesce. Several ulcers formed in the mass, after a period of a month the whole area enlarging, involving the cheek, soon presented a hideous appearance. The discharge was so vile that the patient was almost driven to suicide. Her mental condition need not be described, because it can be realized by looking at the first photograph.

Most of the money earned by her husband and father was spent among physicians and specialists to find relief, but apparently without effect. The patient was reluctant about being photographed, but when prepared for her treatment I placed a mask over her eyes in such a manner that she would never be recognized, and took the picture with a pocket kodak, which I failed to hold steady and also failed to secure good light, but they will show in a measure the condition at first and the condition as I believe cured.

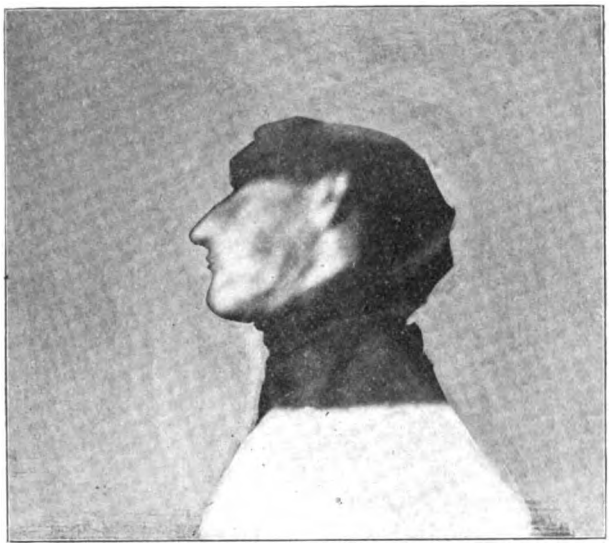
Modus Operandi.

This patient began treatment Feb. 5, 1901.

The same procedure as with the Lupus Erythematosus case, excepting the use of the low vacuum tube and prolonging the treatment on the fourth, fifth and sixth days to thirty minutes twice daily, carrying her to the burning, or as I term it, the sunburn point, then dropping the time of treatment to five or three minutes in duration, as I deem wise.

In this case I produced a severe burn in the center of the large ulcer, and two small points near it. These discharged more profusely than ever. One strange feature in connection with this was that after the fourth treatment there was practically no odor.

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This photograph shows the three points of ulceration.

After the third week of treatment, strange to say, the large ulcer began to heal, leaving the two small ones discharging. By the middle of the fourth week the two small ones stopped discharging, and healing continued rapidly. At this point I gave the patient predigested food and Gude's Pepto Mangan, with good results.



This photograph shows the patient after the sixth week.

Five months have gone by and there has been no return of the malady.

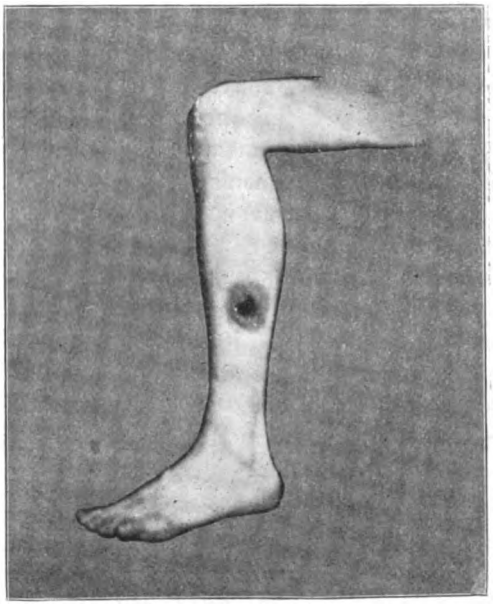
I have been requested to add to this article a description and photograph of a cured cancer case, theory of cure.

Mr. S.—Cancer of epitheleal variety.

This case I began treating a little over two years ago. Cancer eaten out the right side of nose and had almost reached the orbit; patient suffered severely; discharge and odor was very bad; diagnosis confirmed by several Chicago physicians and surgeons and prognosis of three months' limit to live was given.

This patient was among the first to be cured and was burned severely because the mask did not fit properly and the tube was very low in vacuum. However, after the effects of the burn had disappeared the face healed rapidly. Soon after the first treatments the odor, pain and discharge were gone. The opening, as shown by the photograph, has been perfectly healthy ever since—nearly two years ago—and I believe it will remain so. This was evidently the first cancer cure on record in Chicago.



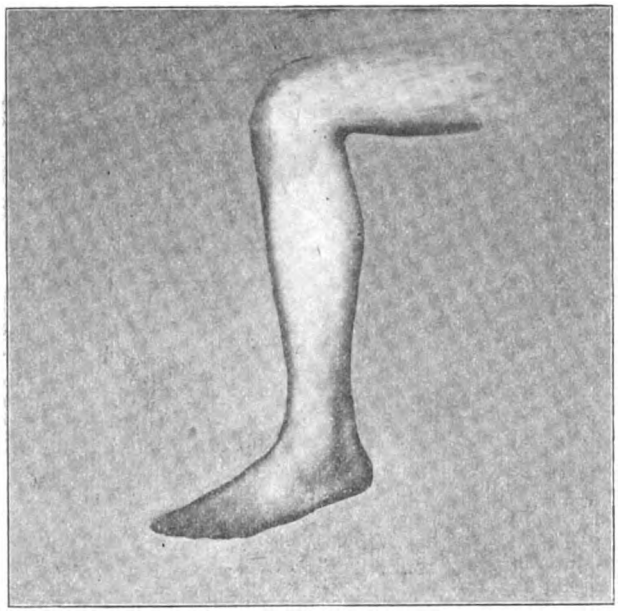


Clinical Case.—This man has specific history. Re-

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covery from syphilis claimed after three months of medical treatment.

Two years later ulcer appeared upon left leg; no varicose condition present or history of injury. Treated by X-rays for a period of nearly two weeks. After first week healing process quite marked; stopped treatment and at the end of three weeks it was almost



healed. Five months have now gone by and patient is well. The second photograph showed the limb after one and one-half months.

Theory.

In regard to my theory for the therapeutic results of X-ray treatment, I quote from an article published in the Clinique some time ago. I have not changed my mind at all since; in fact, the longer I work with this wonderful influence the more I am convinced that this theory is the most satisfactory one yet advanced.

The theory which I have to offer for the results obtained by the methods I have used may be considered somewhat radical. We have proven in the laboratory that the X-rays will produce a marked influence in the number and development of the white blood corpuscles. When in a man's system an alarm arises against the insidious advances of cancer, the defense invariably is an increase of the leucocytes with a vitality commensurate with the vitality of the system attacked. If there be no debility, the increased number of the colorless cells with their unimpaired vitality will inclose the virulent micro-organisms of cancer and destroy them. These cases never progress far enough to be pathognomonic; they are aborted by the germicidal leucocyte.

Far different is the case of a man who is physically below par. Like will never produce anything but like; thus, although the white cells increase and multiply in enormous and ever-increasing numbers, from nature's determination to raise her only adequate barrier against the enemy's encroachment, the effort is vain. The cells are more than sufficient in quantity, but the quality of vitality is absent. A survival of the stronger results and the man succumbs.

Result of the Treatment.

Now, in our treatment, I believe that the terrific vibratory action of the ether exercises a molecular vibratory influence upon the cell structure and imparts to it such a recuperative influence that it is more vital than the pathogenic organism and destroys it. In addition there is produced a stimulation of the muscles and nerve cells.

This result obtains very gradually. Comparatively few cells are influenced at first. These pass on into the circulation with their acquired stimulation, and are added to by each successive treatment. At last, the scavenger of microbic life, the leucocyte, furnished by the X-rays, with a full measure of its characteristic power, sweeps from the body the deadly organism and the man recovers.

It is impossible that the X-ray burn is produced by heat, as some physicists contend, because heat has its origin in the transverse vibratory action of ether, and the X-rays manifest themselves otherwise. I believe that the burn is a burn produced by friction, not of ether particles, so called, but of the irregular molecular activity caused by the irregular vibratory action of the ether. It is impossible to have friction in ether per se; in matter it is possible, but ether has the property of transmitting molecular action to matter.

OAKLAND MUSIC HALL, CHICAGO.

ELECTRO DIAGNOSIS.

(A paper read by Dr. S V. Cleavenger before the Chicago Electro-Medical Society.)

In the early beginnings of electro-therapeutics there was not much system, but each for himself settled upon some points that he had discovered in his use of electric agencies, without having or attempting to have a system of diagnosis, much less a system in practice.

Often about all they knew was that if the application of one current did not affect the patient favorably, they must try the other; but gradually there came to be a system. We know now that in electro-diagnosis there are certain points—I may call them nerve centers—governing the different parts of the body, and these nerve centers may be marked out upon the body as a map to serve as guides in the diagnosis of disease.

But at the same time we must remember that all these centers, with their network of nerves, are intimately connected, and their action becomes involved, so that care must be taken to distinguish the real from the involved parts, but by careful observation we are now able to locate with considerable accuracy diseases; and especially such as are of a nervous character, and treat them by electricity with success. In diagnosing a patient who comes to you with a hys-

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terical headache, caused by nervousness, such a patient can be cured of this hysterical headache by giving an electric treatment almost immediately.

For certain cases, such as diagnosing diseases of the spine and several cases which I could mention, we have no trouble in locating the difficulty, and these can be cured with electric treatment the same as in hysterical diseases, but I do not say that it will cure all diseases. Yet in the lines indicated we may depend upon it with confidence, though we have found that in diagnosis and therapeutic practice we have use for both the static and the galvanic currents, as we would make diagnosis in cases where paralysis is indicated; for while you may not be able to get a response to the current from the static machine, you may get it from the galvanic, and vice versa. We need also to know the points or centers of nervous action, of which I have spoken, of the different parts of the body; and also we must always take into consideration what I call the personal equation, as no two persons are ever to be considered as alike in their electrical polarization. But if we do notice these centers, of which I have spoken, we can detect whether the case is real or one of shaming, as is sometimes attempted in a suit for damages.

In diagnosing a sickness the X-ray is not generally used, but as a rule in locating the position of an internal disease, as, for instance, tumors or any inward growth. If you have a patient who has had an injury caused by an accident, by using the static machine you will be able to locate the exact point of injury.

Speaking of the lack of system in the earlier practice of electro-therapeutics, I would say that the importance of systemizing was soon recognized by our profession, and especially in Germany, and to them are we indebted for the foundations of a scientifically expressed electro-diagnosis.

Before 1889 the German symbols to denote physiological reactions in electrical examination were those mainly in use by writers on that subject.

The anode or positive pole was written An, the kathode or negative pole was designated by Ko. Oeffnung or opening of the circuit was O. Schliessung or closing was S. A weak contraction Zuckung was Z, Starke Zuckung or strayer and sehr starke Zuckung or tetanic contractions were indicated by primes, seconds and thirds appended to the Z'Z" and Z'". Or Te was substituted for the latter.

Ku S. Te would mean that the cathodal closing induced tetanic contraction, and O. Z. that the anodel opening caused a feeble contraction.

The English substituted C. for closing, O. for opening, C. for cathode and A for anode, also using C. for contraction, the normal reaction occuring in this definite order: (1) CCC, (2) ACC, (3) AOC, (4) COC.

But both the German system of Erb and the English of De Watterville were originated before the absolute galvanometer came into use, the addition of cells one at a time affording the increased current; but in recognition of the varying amperage resulting from the same number of cells at different instants, the reactions were crudely described as weak, strong, still stronger and very strong.

In reviewing the subject of electro-diagnosis in spinal concussion, published in 1899, I suggested a condensed and practical symbolization in a chapter entitled "Electro-Diagnosis," based upon the practicability of measuring the reactions in figures of milliampere degrees, an infinitely more accurate system than one using such indefinite terms as weak, strong, etc.

The simplified notation drops the C from contraction as understood, the following being the normal reactions:

(1) CC_3, Cathodal closing three milliamperes.
(2) AC6, Anodal closing six milliamperes.
(3) AO8, Anodal opening eight milliamperes.
(4) CO15, Cathodal opening fifteen milliamperes.

Each one of the above amounts of current sufficing to cause the same flicker of a muscle in the test, an increase of milliamperage would increase the reaction proportionately. In electro-diagnosis the main search is for the smallest amount of current that will induce response, and when this can be stated precisely by figures the advantages over the older methods can be seen at once. Any departure from the normal, such as CCC and AC_3, as in the reaction of degeneration, also being capable of precise recording, which is impossible under the older methods of notation.

The above address was discussed by Dr. G. G. Burdick as follows:

Dr. Clevenger deserves credit for his paper on Electro-Diagnosis," and his address can only be discussed to commend his work. He has completely covered all that is known on the subject. The method originated in Germany, and as usual comes to us with considerable unnecessary packing, which makes the subject very hard to be understood by a beginner; but slow, painstaking work will eventually do away with the useless parts, and true value of the method will assert itself.

A few years ago, when I was more enthusiastic in regard to this method of diagnosis, I had occasion to maintain my position in court. It took two days, with the help of two lawyers and three doctors, to convince the jury that electro-diagnosis was something that would not bite, and even with all their able help the result was questionable, as a verdict of $35,000 was returned, which was reversed in the upper court. I still think that this is a better method of arriving at a conclusion in a medico-legal case, and will save a good deal of unnecessary waste of "gray matter" trying to convince a jury. Generally a plain statement of facts will carry more weight with a jury than all the more elaborate theories and fine hair-splitting methods of diagnosis ever devised.

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(Special for American Electro-Therapeutic and X-Ray Era.)

RADIOGRAPH OF UTERUS TEN WEEKS PREGNANT, WITH FULL EXPLANATIONS.

By Dr. Byron Robinson.

As this is the first opportunity in ten years' search that I have found to secure such a radiograph of pregnancy, I have thought it would be of interest to the profession to present it.

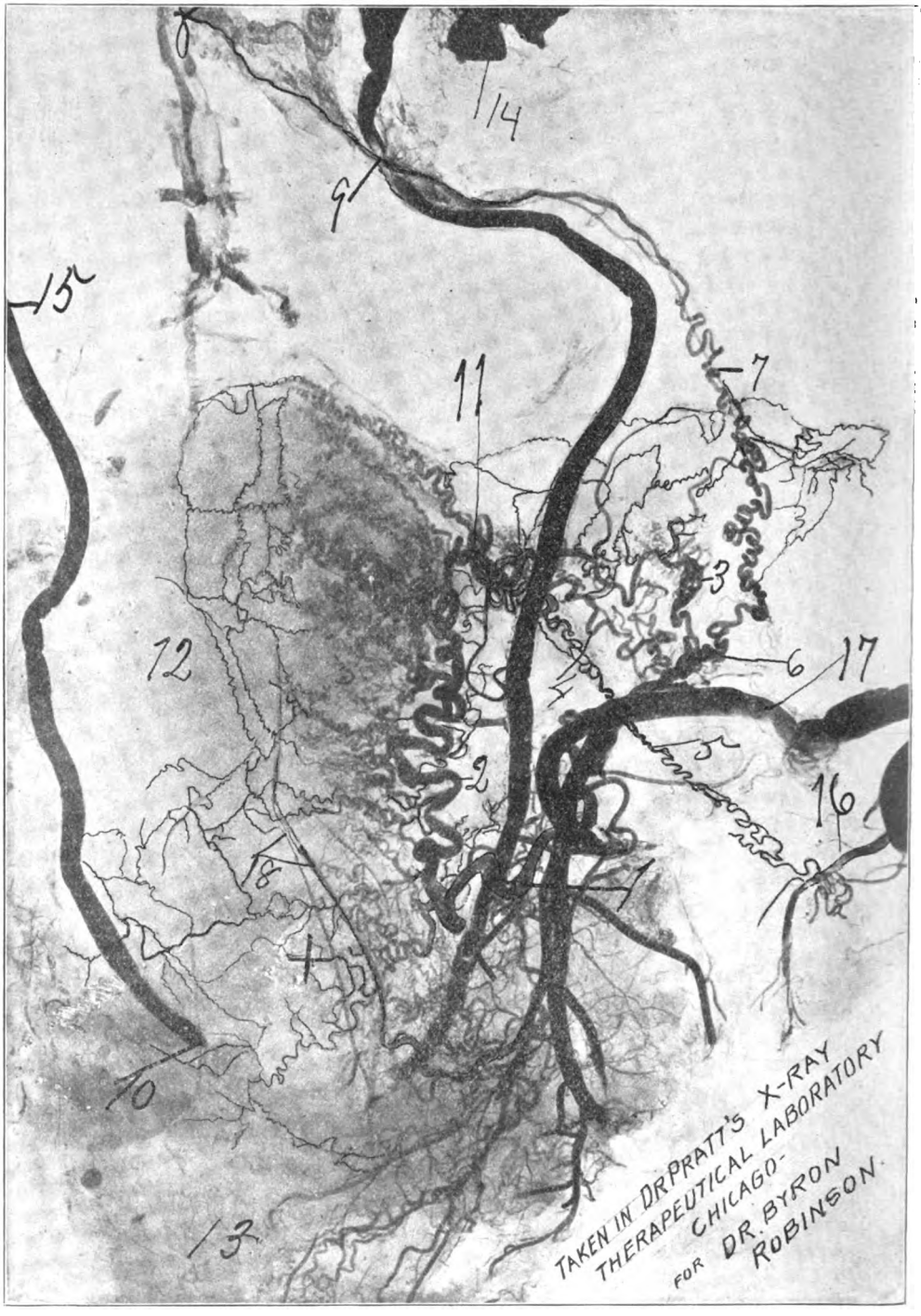
Fig. 1 illustrates an X-ray of a uterus ten weeks pregnant. The X-ray was taken in Dr. H. P. Pratt's X-ray laboratory for me. At the post-mortem I injected the genitals in situ. In the right comiliac I forced in starch and red lead, which shows so well in the cut. I filled both ureters with red lead and starch. The uterus had expelled its fœtal contents five days before death. The subject was about 32 years old, with four living children and several miscarriages.

1. The pelvic floor segment, with its uretero-arterial loop passing proximal (above) the ureter, after which the internal section of the pelvic floor segment rolls upon itself like a twisted rope and projects distalward. 1 is at the distal arterio-ureteral crossing and divides the pelvic floor segment into two divisions—namely, the external and the internal portions.

2. The uterus segment, which passes in a sinuous course between the blades of the ligamentum latum from the os uteri interum to the utero-oviducal angle (at 11). It is about a fifth of an inch from the Nyometrium lying in a rich bed of connective tissue. It sends off the rami lateralis uteri (about 10) to the cervix, corpus and fundas each of which differ in characteristics 3 and 4. The oviducal segment consists of two branches—namely: (3) The ramus oviductus and (4) the ramus ovorii. In this subject both branches send long and short Helicine arteries to the ovori. The oviducal segment ends at 6, where they anatomize. 6, 7 and 8 the ovoran segment, which extends from the oviducal pole of the ovary to the aorta near its renal artery.

In woman and many other animals it rapidly enlarges in pregnancy.

5. The segment of its round ligament extending from the deep epigastric to the ramus oviduclus near its utero-oviducal angle. This segment lies in the center of the ligamentum rotundum uteri and is very tortuous.



The utero-ovarian artery consists of a tripedal arch whose feet are located one on the internal iliac (uterine), a second at the deep epigastric (that of the round ligament), and a third foot (the ovarian) on the anterior surface of the aorta near the renal artery.

9 is the proximal arteri-utereral crossing.

10 is the venicle orifice of the ureter.

11 junction of the uterine segment with the oviducal segment.

12 shows the longitudinal anastomosis of the uterus.

13 vaginal and vesicle arteries.

14 shows two ureteral calices.

15 proximal end of the ureter.

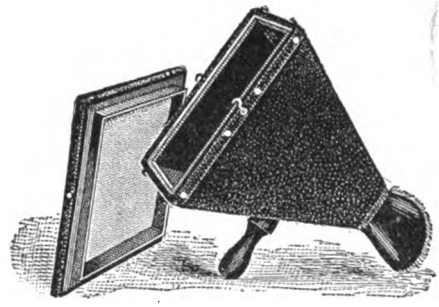
16 deep epigastric artery from which springs the artery of the round ligament.

17 internal iliac artery drawn laterally.

18 shows two long straight vesicle arteries.

The cross (+) represents the os uteri extemum. Some of the injected vessels showing but a dim shadow which was slightly strengthened by the pen.

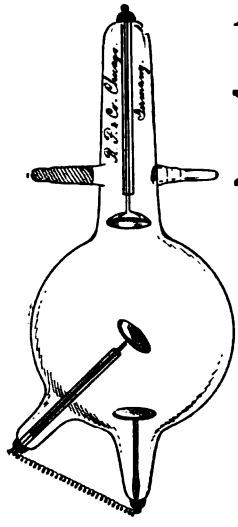
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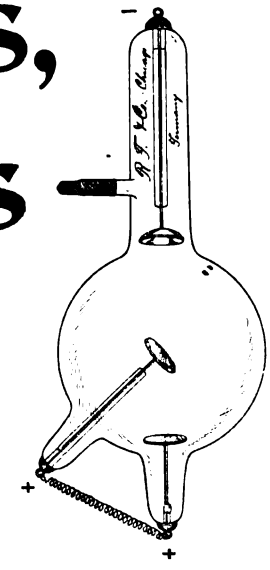
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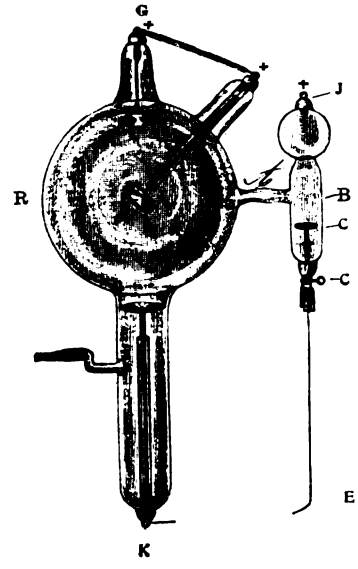
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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

TO OUR READERS.

We would again call the attention of the medical profession to our "Personal Letter" in the July number, requesting subscriptions in order that we may meet the requirements of the postal laws in regard to second-class matter—viz., to secure second-class rates we may not mail or even print more than double the number of regular subscribers. Consequently, until the requisite number of subscribers is obtained, we are necessarily subjected to a large postal expense that otherwise would not be called for, which in the large edition which we issue amounts to quite a considerable sum.

While we are gratified at the large number of subscriptions already forwarded, we still need many others to put our edition of 10,000 on correct basis.

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue.

The August number of the American X-Ray Journal is on our table, as usual well filled with interesting matter. The Journal has a very pleasant word for us, which we appreciate and fraternally return greeting. There is work and field enough for us both.

Notice.

The next regular meeting of the Chicago Electro-Medical Society will be held Tuesday, Aug. 27, at 8 p. m., at the balcony clubroom of the Palmer House.

SECRETARY'S REPORT OF THE JULY MEETING OF THE CHICAGO ELECTRO-MEDICAL SOCIETY.

Meeting of the Chicago Electro-Medical Society held Tuesday, July 30, in the balcony clubroom of the Palmer House, State and Monroe streets, Chicago. President in the chair. Meeting called to order at 8:20 p. m.

Minutes of last meeting read by the secretary. On motion they were approved and accepted as read. At the request of the chair, the secretary read correspondence from the State Board of Health and Illinois Medical Journal in relation to the society, its workings and members. Moved that all following business be postponed until after the reading of the paper of the evening. Motion lost. The president requested those who were interested in the society and wishing to join to please give their names to the secretary. In response to this request a number came forward and their names were placed on file to be voted upon at a later meeting.

A paper entitled "Electro-Diagnosis" was read by the president, Dr. S. V. Clevenger, and its great merit, with its excellence of delivery, was thoroughly appreciated by the society.

The paper was ably discussed by Drs. Burdick, Pratt, Lewis and Prof. Treadwell.

Committee reports requested by the chair. The chairman of the executive committee requested more time, as, owing to the extreme heat, the committee had been unable to meet.

Dr. Pratt called attention to a meeting in Buffalo next month of the Roentgen Society of America, whose business would be the discussion of the X-ray in therapeutics, and suggested that it would be advantageous to our society to appoint a committee to attend the Buffalo convention, as its conclusions would be of great interest to us in our work.

He also called attention to a paper from Dr. S. H. Monell in respect to X-ray nomenclature, and it was moved and carried that the next meeting be set aside

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for the discussion of X-ray nomenclature as indicated by Dr. Monell.

Prof. Treadwell suggested that articles printed in our official organ should be considered subjects for discussion at the following meeting. Approved by the chair.

Moved and carried that a vote of thanks be extended to Dr. Baer and Mr. R. Friedlander, publisher of our official organ, for the work they had done in behalf of the society preparatory to this meeting.

On motion meeting adjourned to Tuesday evening, Aug. 27. RICHARD H. STREET, M. D.,
Secretary.

The regular meeting of the Chicago Electro-Medical Society was held at the Palmer House Tuesday evening, July 30, and was well attended. The secretary's report, of which is in our columns.

The address of Dr. Clevenger, president of the society, upon "Electro-Diagnosis" was delivered in an easy yet very effective, conversational style, which was all the more interesting to his highly cultured audience. The doctor is at the same time a well-skilled presiding officer, and the society is to be congratulated in its choice of a president who is not only a careful student of science, but at the same time a good parliamentarian, for such are needed if business is effectively hastened. Following the address came the discussion of the subject, which was conducted in such fraternal spirit that all went away with a feeling that the occasion was one of pleasure as well as of real gain in the line of co-operative knowledge—such knowledge as may be truly termed scientific, instead of the loose empiricism that was in the early days of electro-therapeutics the rule rather than the exception. We congratulate the profession upon the high advance manifested, and we can but feel that the Chicago Electro-Medical Society is one that will be "authority" in its line of work among the saviors of electro-therapeutics, where science is the mark of the prize, and the cure of human ills the prize itself.

S. H. Monell, M. D., chairman of Committee on "Standards," Roentgen Society of Nomenclature in X-Ray Work, makes appeal to all persons whomsoever that have any knowledge on this subject, and especially to medical men who are interested in the attainment of a true scientific knowledge, as follows:

Committee on Standards: Dear Sir—To promote uniformity in results and to secure accuracy and give legal value to the evidence of X-rays, it is necessary to standardize methods of doing the work. To this common benefit all X-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports and indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard X-ray photograph plate should possess.

Qualities which a standard X-ray fluoroscope screen should possess.

Standard handle for all X-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard X-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of X-ray radiance.

Standard "skiameter."

Standard X-ray examination table adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a standard exposure should be (of medico-legal value).

Standard landmarks to be pictured in the negative as inherent proof that a standard exposure was made—a medico-legal necessity.

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for X-ray dental diagnosis.

Standard technique for X-ray eye work.

Standard technique for X-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions, which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an X-ray negative to secure the picture.

Standard technique for therapeutic administration of X-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased

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also to have you select one or more features of the above list in which you have had special experience, and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks.

In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain,

Fraternally yours,
S. H. MONELL, M. D.,
Chairman of Committee on Standards,
47 West Twenty-seventh street, New York City.

TREATMENT OF CARCINOMA BY X-RAYS.

Johnson and Merrill (Phil. Med. Journal) report on six cases treated as follows: Case 1—Epithelioma of face in a man of 45, recurrent after excision; fifteen exposures, given every other day. Six months afterward healed with healthy cicatrix. Case 2—Ulcerating epithelioma of nose. Exposures of six minutes, given on alternate days. Healing when last seen. Case 3—Ulcerating epithelioma of lip. Exposures as before. Discharge lessened and became less offensive, but tumor did not disappear. Case 4—Recurrent cancer of breast after excision. No change in the recurrent nodula, but pain relieved. Case 5—Epithelioma of nose. After two months' treatment ulcer healed and tumor diminished in size. Case 6—Epithelioma of nose cured after a month's treatment.

The doctors recommend a soft or low vacuum tube. The healthy skin is protected by tinfoil. The object is to cause a mild inflammation of the diseased tissue, gradually increasing its severity till there is a burn which requires six weeks to heal. Treatment is then suspended for a month, and if a complete cure is not then in prospect the process is continued. They recommend the method even in inoperable cases, since it gives relief from pain.

ROENTGEN SOCIETY OF THE UNITED STATES.

Announcement of Committee on Arrangements.

The committee on arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the dean and faculty of the University of Buffalo, the use of as much of its building as they may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N. Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, secretary, drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be prepaid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the prepaid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. All exhibits must be removed by Sept. 13.

Edgar B. Stevens, Chairman.
Roger Cook Adams, Sec., Drawer 693.
Dr. James W. Putnam,
Dr. Elmer E. Starr,
Dr. Rennick R. Ross,
Committee.

ULCER RODENS.

Dr. Stembeck reports a case of rodent ulcer of the bridge of the nose cured by the action of the X-rays. The patient was a woman 72 years of age, and the ulcer had been present nine years. Exposure lasted from ten to twelve minutes, the distance of the tube was 15 to 20 centimeters. Reaction was visible after four exposures, which were made daily. Suppuration followed after ten. After thirty-five sittings a new, thin epidermis formed, and the intensity of the application was increased so that the patient was treated daily for fifteen minutes at a distance of only 10 centimeters.

Sufficient time has not yet passed to say whether the cure is final or not.—Mittheiburg aus den Grenzgebieten der Med. and Chir., May, 1901.

Dr. Seyneira demonstrated Jan. 3, 1901, before the Roentgen Society of London four cases of ulcers rodens which he believes to have been cured by X-ray treatment. Outside of the above cases he claims to have a good many more patients under X-ray treatment with good results shown so far, but whose cure is not yet completed. Looking at the photographs taken before and after treatment the results are simply marvelous.

The scars are thin and can scarcely be seen, all ulceration has disappeared. Diagnosis to prove the disease was made in several cases, even by microscopy, before exposing with rays, which should be very energetic.

We must give Dr. S. credit for the careful way in which he expresses himself, in spite of his success, saying: That there are also other methods through which cure can be accomplished, and that the time has as yet been too limited to carefully observe the results or even to speak of complete cure until more time has elapsed.

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(From The Railway Surgeon.)

OBSERVATION ON THE X-RAY IN THE TREATMENT OF FRACTURES.

Probably the most costly errors in medicine are errors of observation, and these may be as readily made by those who use the X-ray as by those who use the stethoscope, the ophthalmoscope or almost any other scientific appliance. Unfortunately, raidoscopy gives no short cut to knowledge.

The shadows that we obtain require experience and thought for their interpretation. It is perhaps difficult not to endeavor to see in hazy shadows just what we wish to see. Sometimes there may arise a tendency to misinterpret delicate shadings, and to regard them as proof of preconceived notions as to pathological conditions present.

To arrive at trustworthy conclusions in obscure cases requires, besides an unbiased mind, intimate knowledge of many facts.

In children and young adults centers of ossification and epiphysial lines must always be borne in mind. Again, anomalies due to anatomic reversions and the like may be encountered. Comparison with the sound side will generally eliminate this last source of error. In obscure conditions about the hip joint in children we may go far astray if we are unfamiliar with the shadows cast, seen by cartilage only partially ossified under different intensities of illumination.

Again, unless pictures are taken from different aspects of a limb, fallacy is easy. A very crooked bone may show a straight projection in one plane.

Patients are entitled to know the advantages and dangers of this aid to diagnosis, that they may accept it or not as they see fit. It is certainly true that a bone seemingly set in a most artless fashion, when viewed in the light of the X-ray, may be functionally practically perfect. This may at times have a most important bearing from a medico-legal standpoint.

PATHOLOGICAL EFFECTS IN THE REMOVAL OF SUPERFLUOUS HAIRS.

MARGARET SHARP, L. R., C. P.

In the reports of the London Roentgen Society (May, 1901) Margaret M. Sharpe, L. R. C. P., says, speaking of comparative effects of X-ray tubes and electric currents in the removal of hairs: "There are, I know, still operators who are content to perform that operation without avoiding the dermatitis, which they say is a necessary part of the process—to be kept within bounds, of course, if you can—but I still maintain, as I did in 1899, that they are wrong. The only case of dermatitis that I have had in my practice of that operation is the only case in which the hairs did not come out. In all my other cases the hairs have come out without nothing more than a slight soreness of the skin, and they have not returned. I had one case under observation three years and another two years. Now, there is nothing strange in this if we are dealing with electric currents, for hairs and electricity have a peculiar affinity for each other. Subject a hairy skin to any kind of an electric current and you will see the hairs all bristling at once. In that condition each hair will act as a miniature lightning conductor in presence of a static charge, and each will conduct a little charge down to the root, where it will work havoc in the hair bulb and papilla. I have often given shocks to individual hairs and drawn them out with the greatest ease. I do not mean to say that the action of the X-ray tube is so violent as that, but the effect is the same in the long run.

"And this effect, what is it physiologically? As regards the hairs, I think this is plain enough—a prolonged constriction of the vessels, ending in starvation of the papillæ and hair roots. A hair that is extracted after a long tube treatment has no root; it ends in a point, with no structure at all, to speak of, and no medulla. Probably there has been electrolytic action as well. The action on new growth is, I think, explainable on the same theory.

"The superficial layers of epithelium are starved, necrose, and shed themselves as scabs. New growths of epithelial tissue are easily starved; the cells are not in very intimate connection with their blood supply. The action only affects the superficial layer, and a process of gradual destruction goes on which would not be sufficiently powerful to injure more highly vitalized tissue.

"Having destroyed the growth, the next thing required is to restore the normal tissue from which the disease has sprung till it has attained strength to fight its own battle, and no longer offers a suitable field for the growth of germs, and that electric currents certainly do, probably by oxygenating the tissues. The treatment of rodent ulcer ought to show this process well.

"There is an erythema which is produced by electric discharges, which I have also seen after prolonged use of the X-ray tube, and which has, I believe, in many cases been mistaken for X-ray dematitis. I have seen it mentioned in reports of cases where very brilliant tubes had been used, but I have never seen it distinguished from X-ray dermatitis, though it is very transitory, which we all know to our cost, the other is not. It always appears after severe application of high frequency currents, is slightly sore to the touch, and lasts two or three hours. It is much more pronounced in hairy tissues, where there is generally slight swelling, probably due to sebaceous exudations, the soreness is more pronounced and the condition remains for two or three days. I have often seen it induced by the careless adjustment of the tinfoil marks. The tinfoil condenses the current from the tube, and if allowed to come near the skin the erythema soon appears, caused by the condensation of the

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current. If you try this experiment with the fluorescent screen taking the place of the patient, you will see a line of intenser fluorescense where the edge of the tinfoil intervenes. It is easily distinguishable from X-ray dermatitis by its beginning superficially—the skin peels after it, if it has been at all severe.

"The conclusion is that the soft tube is best, but in no case ought the exposure to be long continued; and as a remedial agent in the removal of hairs the X-ray is far preferable to electrolysis by static current."

X-RAY IN DIAGNOSIS.

As was said by a well-known physician in discussing the case of Frank Collier, who recently died at the County Hospital, "Every surgeon in Chicago knew or had a chance to know years ago as much about the abnormal growth that pressed upon his brain, as was learned at the post-mortem examination, and they knew it because the X-ray had shown conclusively what was wrong with the man." The skiagraph taken three years ago told the story plainly, showing the exact bony growths that were found at the autopsy. With this case, where demonstration is so clear, it will not be up-to-date wisdom in any surgeon to neglect Roentgen's great discovery, for time proves its value.

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CHARLES H. TREADWELL, B. S.,
Formerly Instructor in Physics in Syracuse University.

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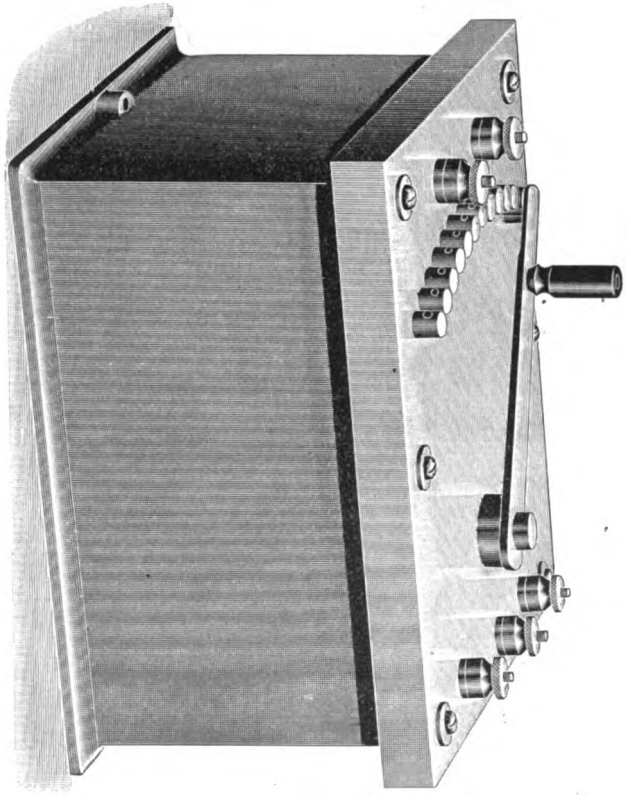
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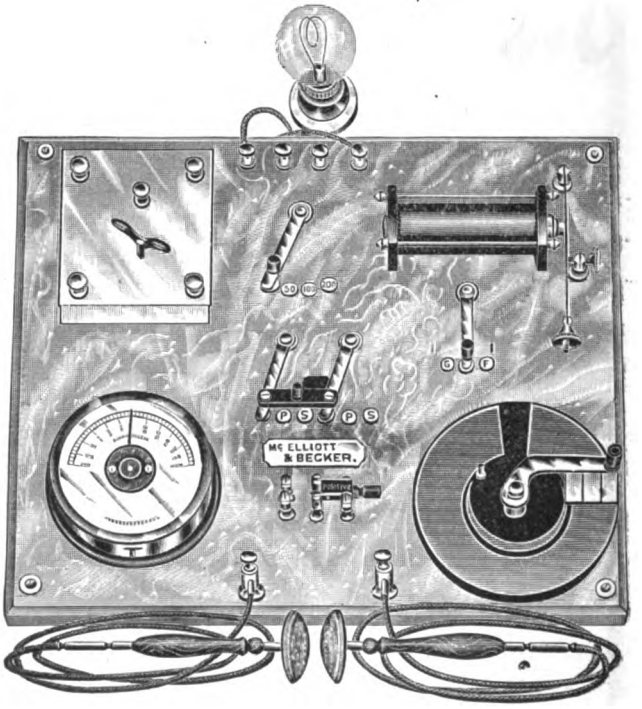
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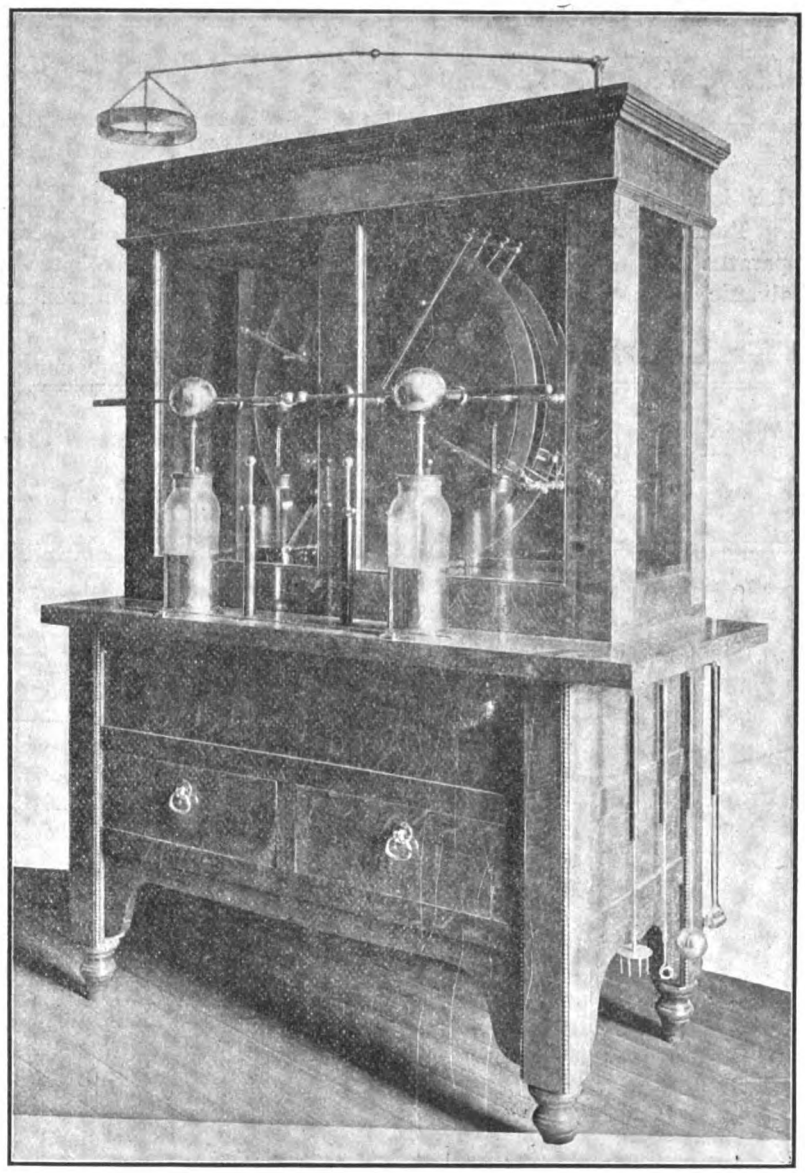
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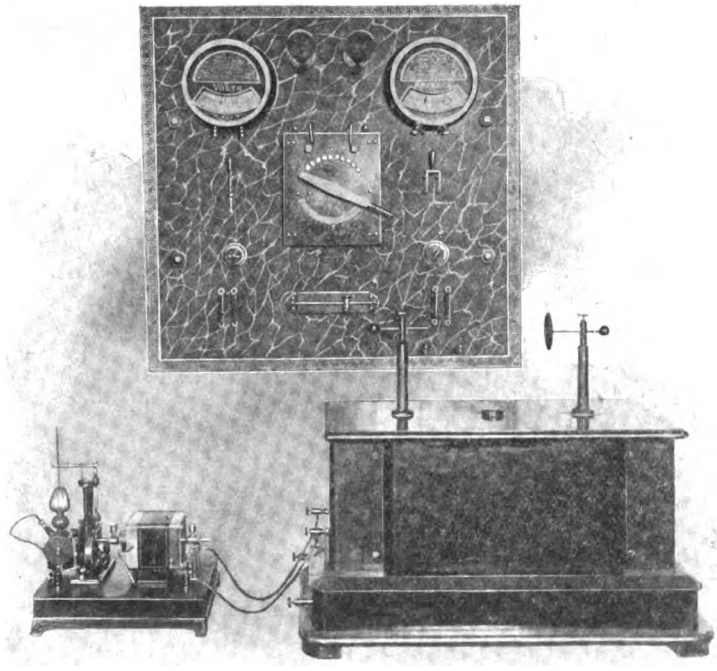
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ROENTGEN RAYS IN THE TREATMENT OF SKIN DISEASES AND FOR THE REMOVAL OF HAIR.

By William Allen Pusey, A. M., M. D.

Professor of Dermatology in the College of Physicians and Surgeons of Chicago, the College of Medicine of the University of Illinois, as read Before Chicago Medical Society, March, 1900.

Perhaps no more unexpected accidents ever happened than those which were announced upon the very heels of the first use of X-rays. It was as astonishing as the rays themselves that exposure without painful sensation to what is apparently a form of light could cause damage to tissues, which under certain circumstances might amount even to necrosis. There is no analogous clinical fact from which the occurrence of the severer forms of X-ray injuries might have been foreseen. It was a new phenomenon. There was at first no thought of caution, and, as a result, reports of injuries came thick and fast during the early and enthusiastic use of the rays, so that it did not take long for all the forms of injury, which are now known, to be reported. Indeed, about all of the injuries of consequence that have occurred, occurred during this early period of incautious use.

These effects of X-rays upon the skin and subcutaneous tissues were soon found to be of the following kinds:

I. Changes in the epidermis itself or in its appendages.
 a. Pigmentation.
 b. Blanching of the hair.
 c. Outfall of the hair.
 d. Trophic changes in the nails similar to those in the hair, sometimes resulting in interference with growth and in severer cases in shedding of the nails.

II. Changes in the corium and subcutaneous tissues. These are all inflammatory in character, varying from slight erythema through all degrees of dermatitis up to necrosis.

It is not surprising, with results of this sort testifying to the influence which X-rays are capable of exerting upon the nutrition of tissues, that the possibility should suggest itself of utilizing such an agent for therapeutic purposes. The two actions of X-rays upon tissues which offered the most promising prospects of utilization for therapeutic purposes were:

I. Its power of causing the falling out of hair, and,

II. Its power of producing inflammatory reaction and influencing the nutrition of connective tissue.

A method of removing hair conveniently and thoroughly and without pain is a desideratum in the treatment of a number of diseases. If the method could be so developed as to furnish a means of permanently removing hair it would have a most valuable field of usefulness in the treatment of cosmetic defects. There is also a wide range of usefulness for an agent capable of influencing the nutrition of the connective tissue structures of the skin, particularly if it may be so managed as to exercise some selective action upon tissues of low degree of vitality.

The problem of utilizing these properties of X-rays for therapeutic purposes has involved not only the determination of the effects of X-rays upon tissues of various sorts, healthy and diseased, but the determination of the conditions under which the desired results might be attained within the limits of safety. A number of experimenters have engaged in clearing up these questions. The results which have been attained by various workers in establishing the conditions of safety for the use of X-rays for diagnostic purposes have furnished many of the data which have been utilized in working out the problems of the use of X-rays for therapeutic purposes. Among the workers who have especially devoted their attention to the problems of the therapeutic uses of the X-rays, Schiff and Freund of Vienna deserve first mention. Among others who have contributed to it are Albers-Schonberg, Jutassy, Kummell, Rieder, Musham and others in Germany and Austria. Outside of Germany and Austria, where most of the investigations have been made, there should be mentioned Holland of England, and P. M. Jones of San Francisco, who as far as I know is the first American to have done any work in this line. The credit for first demonstrating the possibilty of using X-rays for therapeutic purposes belongs, I believe, to Freund, who after a consideration of the alopecias accidentally produced by X-rays undertook in November, 1896, to remove the hair from a nevus by their use. Following Freund, Schiff suggested a little later the use of X-rays for the treatment of various diseases of the hair and for the treatment of lupus.

Treatment by exposure to X-rays has been applied chiefly in four classes of affections:

I. In hypertrichosis, for the removal of undesirable hair.

II. In diseases of the hair and hair follicles such as

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sycosis, tinea tonsurans, favus, where the removal of diseased hair is an essential part of treatment.

III. In the treatment of inflammatory affections, like chronic eczema, where the purpose is to stimulate the tissues and cause absorption of inflammatory products.

IV. In certain specific affections, like lupus, where it is desired to cause destruction or absorption of tissues of low vitality.

As already mentioned the first attempt to apply X-rays for therapeutic purposes was an effort by Freund to remove by this means the hair from a nevus. In the three years since this first case Schiff and Freund have applied this method of removing hair to many cases. Many of their cases have now remained free from the recurrence of hairs for more than a year. Jutassy of Buda Pesth has also applied this method of removing hair to a large number of cases. He has reported forty cases of successful removal of hairs by this method, some of which were treated more than a year before the report was made, and had shown no regrowth of the destroyed hair. An interesting case confirmatory of the claims of Freund and Jutassy is reported by Neville Wood of London in the Lancet of January 27th of this year. Treatment by X-rays was undertaken in order to remove a profuse growth of down and large hairs. In this case the chin, the part which had been thoroughly treated remained eight months after cessation of treatment "quite free from down and hair." My own experience with the method is not long enough to allow any statement as to the permanency of the results in cases of this character, but it has demonstrated that by Freund's method of treatment with a very weak, but definite current the hairs from an entire area can be successfully removed.

The removal of hair by this method is attended by no disagreeable sensations and by no accompanying symptoms beyond at times a slight erythema or pigmentation, lasting a short time. The skin after removal of the hair is left in the same condition as before, except for the absence of hair. There seems every reason to believe that in X-rays we have an agent of the utmost value for the removal of hair. It is painless, not nearly so tedious as electrolysis, and can be applied to the hairs of a large surface at one time. When there are only a few large hairs to be removed electrolysis will still be probably the more convenient method, but there is no comparison in convenience between the two methods for taking off a large number of hairs from any given area. For instance all of the hairs from the back of the forearm can be removed together. The method is particularlya dapted to cases in which it is desired to remove down and profuse growth of hair.

The mycotic disease of the hair and hair follicles, such as tinea tonsurance, favus, and sycosis, are among the most intractable diseases that the dermatologist is called upon to treat. The difficulty is in getting at the peccant organisms. In practically all methods of treatment of these affections the first essential is thorough epilation. But thorough epilation is easier said than done, for, leaving out of consideration the pain and tediouness of it, the difficulty of epilation by mechanical means is that in the diseases where it is indicated the hairs become fragile, or so macerated and weak that in the attempts at epilation they break off leaving in the follicles the diseased bulbs and broken hair shafts, filled with the organisms almost out of reach of one's remedies. In the treatment with X-rays this difficulty seems to be overcome in an ideal way. The hairs become loose and are removable without force. It is probable, too, that the effects of X-rays are not limited to their depilatory properties. The clinical course of the cases is such as to indicate that the rays have a marked bactericidal effect, an effect due either directly to the rays or to the stimulation of the tissues with the accompanying increased phagocytosis which the rays cause. In sycosis in particular the method has proven successful. I have seen the results in several cases of sycosis and they are such as to warrant the hope that in the use of X-rays we have the best means of treatment yet found for deep-seated, persistent cases of that disease.

It is conceivable of course that this method could be applied in all conditions where epilation is needed. It has been applied with success by Gocht in wounds of the scalp in which healing was prevented by growth of hair into the wounds. It has not so far as I know been applied for the removal of hairs in trichiasis or for the removal of hairs for any purpose about the eyelids.

Upon the subject of the treatment of eczema by exposure to X-rays there are a number of reports testifying to the favorable results. Albers Schönberg has reported three cases of chronic eczema healed unusually rapidly under this treatment. Hahn has reported similar cases, and Mackey has reported two cases of intractable chronic eczema which showed very great improvement under this treatment. Other cases are to be found in the literature. The cases of eczema in which this method of treatment seems to have a field of usefulness are very intractable, circumscribed patches of chronic eczema in which there is necessity for marked stimulation of the skin in order to get absorption of inflammatory products. There seems to be no ground for believing that the method will have more than a very limited field of usefulness in eczema.

When we come to the treatment of lupus vulgaris by X-rays we reach perhaps the most interesting part of the subject. Upon the use of X-rays in the treatment of lupus we have favorable accounts from many quarters. Schiff, who with justice, I believe, claims priority in the treatment of lupus by this method, has treated

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many cases in this way and has published a number of cures. His first case showed one year after healing no recurrence of lupus in the areas which had been treated, while lupus foci in the areas which had not been treated had increased. Kummell has reported 16 cases which he had treated by this method. Of these, two did not continue treatment long enough to give the method a trial. In one case, a lupus of the finger, the lupus entirely healed, but the finger was afterwards amputated for disease of the bone, the skin being healthy. The healing of the skin lesion in this case while the deeper structures remained unaffected is an interesting observation confirming the experimental observations of Rieder and others that the rays are effective against superficial tubercular lesions while they cannot be used safely in sufficient strength to affect deep-seated lesions. To continue with Kummell's report, two patients were under treatment at the time of the report and were showing satisfactory progress. The only case in which no improvement had occurred under this treatment proved to be a case of syphilitic ulceration which healed promptly under antisyphilitic treatment. The 10 remaining cases had been cured. These were cases of lupus of severe type which had previously undergone various sorts of treatment, including in some cases treatment with tuberculin. Some of the cases have remained healed many months after cure by X-rays and in none of them has any tendency to recurrence developed. To use Kummell's words in every case which he had handled "improvement had followed, and, with sufficiently long treatment, healing, which has continued until the present." This showing of Kummell's of 10 cases cured, and no real failure to be charged against the method in 16 cases is certainly interesting. Albers Schonberg has reported two cases cured. The first case, a man of twenty years with lupus of the face and nose, was completely cured and had shown no recurrence a year afterwards. The second, a woman of forty-eight with lupus of the face, was cured after six months' treatment. Gocht has reported one lupus cured.

Holland of England has reported three cases of tuberculosis of the skin or lupus in which he has used X-rays. The first, a tuberculous ulceration of the foot of eleven years' duration, which had resisted various forms of treatment, after two months' treatment with X-rays showed great improvement and bid fair to get well. In his second case, lupus on the left side of the face in a boy fifteen years old in which the usual methods of treatment had failed, treatment by this method was followed after two months by complete healing. There had been no recurrence up to the time of his publishing the case. His third case, lupus of similar character of eleven years' duration in a boy, which had proven intractable to most vigorous treatment, had shown great improvement after one month's treatment and at the time of his report seemed as if it would result in complete cure.

Phillip Mills Jones of San Francisco has reported two cases of lupus treated in this way. The first, a man of fifty-five years with an intractable lupus on the forehead of twelve years' duration, was put upon this treatment in January, 1899. In four weeks the lesions exposed were healed. One ulcerating point had been protected from the rays for the purpose of a control observation; when the other areas had healed, this showed slight increase in size. This patch healed after three weeks of treatment. There had been no recurrence of disease up to the time of his report, January 6th of this year, though the lesions had never remained healed before for more than three months. The observation upon the healing of the exposed lesions and the persistence of the patch not exposed is similar to one made by Schiff in his first case already referred to and furnishes convincing evidence of the direct influence of X-rays upon lupus. Jones reports a second case equally as chronic and intractable in which some areas have already healed, and others now under treatment show every indication of favorable results. These cases of Jones' are, I believe, the first in this country in which X-rays have been used for the treatment of lupus, or indeed for any therapeutic purpose.

These results coming from so many different sources are striking enough to command attention. They justify the hope that in the proper use of X-rays we have a remedy of the greatest importance in this intractable disease. The advantages which this method seems to offer for the treatment of lupus may be briefly summarized as follows:

I. Efficacy. Practically all of the cases which have been treated by this method have been of grave, persistent character and had resisted for years recognized forms of treatment. The diagnosis in practically all of the cases is above question.

II. Freedom from pain. When one remembers the various other plans of treatment, with the never ending repetition of painful procedures in the severe cases, such as those in which this method has been used, the fact that this method is practically painless appears as an advantage of no small consideration.

III. The character of the scars. All observers agree upon the excellent character of the scars following this method of treatment. They are soft, pliable, and thin, and nearly approach the normal skin in appearance.

The other method of treatment which this one approaches most closely and with which it must bear comparison is Finsen's treatment by the ultra-violet rays of white light. The two methods are similar in using for destruction of the lupus tissue actinic rays of high value. There are the best reasons for believing that the methods are identical in principle, one using

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highly actinic rays derived from white light, the other similar or identical rays which are found among the X-rays. The results attained by the two methods are strikingly similar and are a further argument for the similarity or identity of the essential agents. The advantages which the X-ray method offers are in the way of convenience and rapidity of results. Finsen's method of treatment is inconvenient and excessively slow. Under his methods patients have daily sittings of about two hours, and in an hour it is only possible to treat an area a little over half an inch square. The time required for the treatment of a case extends over about two years. With the method of treatment by X-rays on the other hand the sittings are short, only a few minutes daily, and an area of lupus involving the entire side of the face, for example, can be treated at one sitting. The results further are obtained in a few weeks or at most in a few months.

As to lupus erythematosus, Schiff and others have reported cases cured by this method; there are not, however, enough data available at present to form any opinion as to its value in the treatment of that disease.

Of course, the method has been tried in various other diseases, acne, psoriasis, epithelioma, but the affections which we have already discussed are those in which the method offers the greatest prospects of usefulness. There is no ground for believing that in this method we have found a panacea for skin diseases.

A consideration of the effects of X-rays upon tissues does not leave us altogether in the dark as to the reason for these results. The condition of tissues affected by X-rays has been studied histologically by several observers; among others by Gilchrist and Kibbe in cases of X-ray dermatitis, and by Oudin Barthelemy and Darier in X-ray baldness. These observers agree that the most marked changes are found in the epithelial structures. The growth of the epidermis is influenced in a remarkable way. There is great increase in the thickness of all the layers of the epidermis, particularly of the mucous layer, increase in the amount of keratohyaline and pigment, and evidences of greatly increased karyokinetic activity, all going to show that there is marked stimulation of the activity of the cells. The studies by Oudin Barthelemy and Darier, in which the histological studies were presumably made by Darier, one of the most noted pathologists in cutaneous pathology in the world, were made upon guinea pigs in which baldness without dermatitis had been produced; and the findings are particularly interesting. Histologically the tissues showed:

I. Enormous thickening of the epidermis in all its layers.

II. Atrophy of the hair follicles, which in places had entirely disappeared

They conclude: "the thickening of the epidermis in all its layers, the increase of keratohyaline, and the quite extraordinary atrophy of the follicles may be viewed as a reaction against an irritant of unusual strength. This irritant appears to increase the vitality of the least differentiated skin elements while the differentiated elements, hair, nails, and glands, undergo retrogressive changes and atrophy. Of the hair follicles only traces remain, one or at most three in a microscopic field and these are no longer follicles, but only conical prolongation of epidermis which dip down seemingly only half so deep as normal follicles. Of hair papilla, or regeneration bulb every trace is lacking." Bearing these observations in mind the statement that permanent removal of hair may be caused by exposure to X-rays loses some of its startling character.

The changes in the corium are those of an ordinary inflammatory process without peculiar features; to quote Kibbe "capillary dilation, with collection of round cells scattered through its (the corium's) structure, particularly around the hair follicles." There is, therefore, little suggestive of the explanation of the effects of X-rays upon diseased conditions of the connective tissue structures of the skin in the histology of X-rays dermatitis, as far as it has been studied. An analysis of the clinical phenomena does, however, throw some light upon the subject. In the first place as regards the hair follicles, Kibbe has made the interesting observation, which I am able to confirm as regards X-ray erythemas, that in the development of an X-ray dermatitis the erythema is seen under a hand lens to develop first as a "punctate redness due to hyperemia around the hair follicles." In sycosis under treatment with X-rays, inflammation first shows around the hair follicles and, I may add, if the exposures are rightly managed, the inflammation may be confined to the perifollicular tissue. In other words, the hair follicles and their connective tissue envelopes are particularly sensitive and react first to the irritation of X-rays. This is more than ever the case if the follicles are already the seat of disease. To this extent, and to this extent only, the X-rays may be said to have a selective action upon the hair follicles in inflammatory affections, like sycosis and tinea tonsurans.

Much the same may be said in regard to its effect in lupus. If a patch of lupus is put under the influence of X-ray exposures the lupus nodules become reddened and inflamed before, or even without at any time, the surrounding healthy tissues being affected. Foci of disease so small as to be imperceptible before treatment become inflamed, redden up, and become visible. If the exposures are persisted in, the lupus nodules will break down and be destroyed before the surrounding tissue is severely affected. In other words the specific tissue of the lupus nodules is of such low vitality that the influence of X-rays may cause its absorption or even destruction before having any considerable effect upon healthy tissue. And thus far the

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rays may be said to have a selective action upon lupus.

The interesting question of the bactericidal effects of the rays of course arises in connection with these bacterial diseases which respond favorably to X-ray exposures. Unfortunately the knowledge upon this subject is not sufficient to allow positive statement at present. Reports of different observers upon the effects of X-rays upon various bacteria do not agree. Upon the retarding or destructive influence of X-rays upon tubercle bacilli there is a good deal of weighty influence. (Lortet and Geroud, Fiorenti and Luraschi, Ravillet, Musham, Rieder). There is also a good deal of evidence to show the retarding or destructive influence of X-rays upon other bacteria. But, upon the whole, the reports upon this subject are conflicting and do not allow of satisfactory conclusions. It is possible that the explanation of the favorable influence of X-ray upon bacterial diseases lies not in the direct destructive influence of the rays upon the bacteria, but in the stimulation of the tissues it causes, placing the cells in a condition in which they are better able to cope with the organisms. As an explanation of the favorable influence which the rays have upon inflammatory infiltrations as well as upon new growths, Kaposi suggests that "the cellular elements are altered in their structure and are thus made ready for absorption."

What is the essential factor in X-rays that produces the effects upon tissues? It would take us too far from our present topic to undertake here a thorough consideration of this subject. I believe the best opinion has come around to the view that it is something in the rays themselves and not some incident of their production, as has been suggested, like ozone or brush discharges or induced electrical currents in the tissues or particles of platinum carried off from the anticathode. As Prof. Elihu Thomson expresses it in discussing some experiments upon this point, "there is only the supposition left that the effect was produced by Rontgen rays or something that comes with the rays." The lesser degrees of X-ray burns resembled sunburns more closely than any other pathological process, and there seems to be no good reason for not believing that the effects of X-rays upon the tissues are due to the actinic rays of the X-rays just as sunburn is due to the actinic rays of sunlight. That certain of the X-rays are strikingly similar in their actinic properties to the rays of light at the violet end of the spectrum is shown by their similar effect upon photographic plates. And it is no violence to the reason to suppose that the same actinic properties of the X-rays that cause rearrangement of molecules and the formation of new salts upon photographic plates can exercise a similar power upon the molecular arrangement of tissue cells and influence their metabolism. The X-rays in their actinic properties are in many respects strikingly similar to the ultraviolet rays of white light. If they are not identical, they at least bear important properties in common in the effects which they have upon chemical compounds and upon tissues.

The practical problem which has to be solved in applying X-rays to the treatment of skin diseases is to so manage the rays as to attain effects sufficient for therapeutic purposes, without overstepping the limits of safety and producing undesirable results. This problem is easier now than it would have appeared three years ago. Space forbids, and it is not necessary, to go into full consideration here of the factors in the production of X-rays which influence the effects upon tissues. As is well known, these factors have chiefly to do with the amperage and voltage of the primary current, the capacity of the coil, the "hardness" of the tube, the rapidity of interruption of the current, the distance from the tube to the exposed surface, and the length of exposure. For the treatment of skin diseases Schiff and Freund have worked these factors out carefully. The conditions to be avoided are, using Freund's words as nearly as possible:

A. Too great strength of primary current. One never uses a current of more than one and one-half amperes and twelve volts strength. This is, of course, a current much weaker than the currents used for skiagraphy. The currents of high amperage which are used in skiagraphy are not used in work of this sort at all.

B. Too great tension of secondary current. One never uses an inductor of more than thirty (30) c. m. spark length.

C. Too long and too frequent exposures.

D. Not sufficient distance between skin and tube.

At the beginning the sittings are not longer than five minutes and the distance of the tube not less than fifteen (15) c. m.

Freund recommends for the attainment of the best results the use of a mechanical interrupter run at the rate of eight hundred (800) to one thousand (1,000) interruptions per minute.

The apparatus required in order to thus accurately apply the method is as follows:

Inductor of thirty (30) c. m. spark length capable of being worked with a current of twelve (12) volts and one and one-half amperes.

Storage battery for the primary current.

Ampere meter and volt meter for the primary current, and of course suitable rheostats and switches.

Mechanical interrupters with tachometer for measuring the number of interruptions.

Suitable lead masks for protecting surfaces which are contiguous to the areas to be treated.

Under the conditions of treatment laid down above and with apparatus of this sort, Freund assured me that in the treatment of a large number of cases he had never had any undesirable results, never any injury amounting to more than a slight dermatitis.

Another factor, probably the most important factor, which has to be taken into consideration, is on the side of the patient—namely, personal idiosyncrasy. It is probable that in all the severer X-ray injuries the most

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important factor has been idiosyncrasy. This factor may be excluded, as suggested by Freund, by making three exposures and leaving off further treatment for three weeks, to see if any effects result. If they occur from so slight exposure the case is not suitable for this treatment.

The evidences that the exposures have been carried far enough are:

I. The appearance of erythema or pigmentation.

II. Blanching of the hair.

III. Loosening of the hair.

In the treatment of hypertrichosis the method is pursued with great caution to avoid irritation. In the treatment of inflammatory conditions less care is taken. It is aimed to produce a very slight degree of inflammatory reaction, and to so regulate the exposure as to hold irritation at this stage. It is not found necessary in the treatment of any of the diseases to carry the irritation to a painful degree.

(Journal of Cutaneous and Genito-Urinary Diseases, July, 1900.)

103 State Street, Chicago.

BLOOD POISONING CURED BY GALVANIC ELECTRICITY

R. G. Hamilton, M. D., Ocheyedan, Ia.

Case—

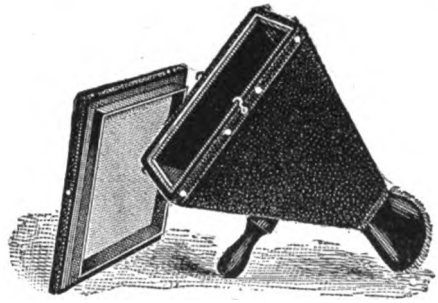
Charles Carnes, age 45, a laborer, came to me on April 12 for relief of pain in his right hand and arm. He gave a history of having scratched his hand on a nail in the feed box when feeding his horses. This he paid no attention to until the next morning, when his hand seemed somewhat painful and stiff, but he considered it as a natural sequel; did nothing for it only to put a bandage on, but it continued to get rapidly worse, and he presented himself to me on the fourth day for treatment. I found upon examination the focus of inoculation had assumed a circular wound surface covered by large violet colored granulation. The hand and arm were swollen, hot and throbbing. The auxiliary glands swollen and painful. Patient had a chill the day before, followed by fever; temp., 103; pulse, 115, on the morning of first treatment. Knowing the germisidal effect of oxo-hydrate of copper, I determined to use galvanism. I covered a copper electrode lightly with absorbent cotton, moistening same in a weak solution of salt, and applied the positive pole to the infected surface, using 10 M. for ten minutes. I then covered the wound with a bandage only and instructed the patient to return the next morning. The next morning I found the swelling and pain gone from the auxillary glands; also pain and swelling very much diminished from hand and arm. I repeated same treatment same as the first day, with instructions to return upon the following day. When I found pain and swelling gone, the large granulations had shrunk. The surface of the wound seemed nearly normal and I discharged patient cured. And so it proved to be. Note: I gave no medicine; I used no antiseptic gauze nor dressings; nothing but the solution of salt on the positive galvanic pole and a clean cloth.

CAUSE OF X-RAY BURNS.

Kienbock, Schraeter and Oudin, from their individual research believe that the X-ray burns are not due to the electricity, but to the X-rays alone. Under interposed screens—part lead, part aluminum—the tissues were liable to become inflamed under the aluminum, while the lead screened portions were never affected, irrespective of the intensity of the electricity employed and the closeness of the tube. This fact has recently been corroborated by Walkoff, Giesel, Becquerel and the Curies, who have been studying the mysterious rays emitted by radium, polonium and uranium. It has been found that these rays possess the same property of inducing X-ray burns as the Crooke's tubes. Some of these scientists caused serious dermatitis on themselves with these rays. The most conclusive proof of all was the fact that Becquerel—in whose honor the rays have been named—produced a severe X-ray burn on himself by carrying a bottle containing a few centigrams of radium in his vest pocket. The accidents of radiography are therefore proportioned to the number and penetration of the X-rays. This article is the report of a committee. It confirms Schraeter's assertion that there are four periods in the life of a tube. During the first it is very soft, the X-rays scanty; the soft parts cast a deep black shadow upon the screen. During the second period the soft parts are still visible on the screen, the shadow of the bones is very black, scarcely lighted in the middle of the phalanges. The tube is rich in X-rays, but they have a comparatively weak penetrating power. They produce the superficial lesions on the skin. In the third period the tube is rich in very penetrating X-rays, and induce deep lesions. The shadow of the soft parts is scarcely visible on the screen and even that of the bones is very light. When the last period is reached, the tube has become extremely resistant, almost all the electricity passes around it, the bones cast scarcely any shadow. It lights up only at intervals and generates very few X-rays, but they possess intense penetrating power and do not induce any lesions. This of course refers to an average exposure. If the exposure during the first and last period was exceptionally long, it would in time induce accidents as during the other periods.

If the above, which we take from the Bulletin de la Soc. Frenc. d'Electrotherapie, is correct, it would seem that the term "X"-ray is still correct, for we as yet must consider it "an unknown quantity"—though much has been said in favor of its being a purely electrical phenomenon. The "ray" or light from the Crooke's tube may be considered also as a property of light as in an exposure to the sun, we all know that similar lesions or "burns" are everywhere found to result from both direct and reflected sun-rays. Yet who shall say the sun itself is not an electrical dynamo?

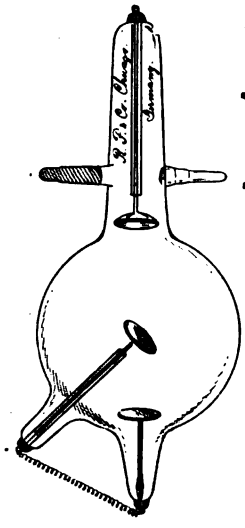
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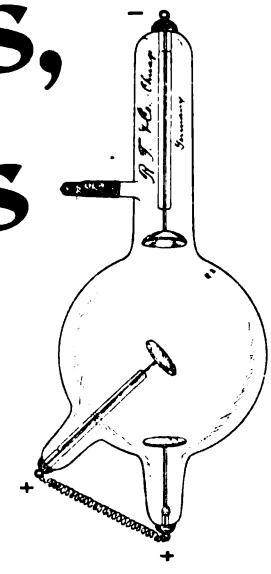
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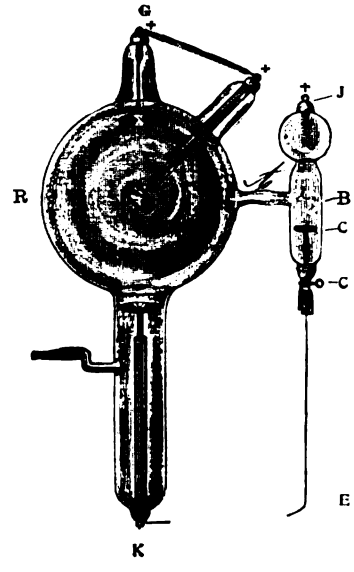


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TO OUR READERS.

We would again call the attention of the medical profession to our "Personal Letter" in the July number, requesting subscriptions in order that we may meet the requirements of the postal laws in regard to second-class matter—viz, to secure second-class rates we may not mail or even print more than double the number of regular subscribers. Consequently, until the requisite number of subscribers is obtained, we are necessarily subjected to a large postal expense that otherwise would not be called for, which in the large edition which we issue amounts to quite a considerable sum.

While we are gratified at the large number of subscriptions already forwarded, we still need many others to put our edition of 10,000 on correct basis.

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue.

The September number of the St. Louis *Medical and Surgical Journal* is on our table, filled as usual with interesting matter. It has a pleasant word for the American Electro-Therapeutic and X-ray Era. Thanks, doctor, and we extend our hand.

Notice.

The next regular meeting of the Chicago Electro-Medical Society will be held Tuesday Sept. 24, at 8 p. m., at 1101 Masonic Temple.

WHY WAS NOT THE X-RAY USED?

While we are satisfied that our late President was ably attended by the physicians in charge, we are forced to ask, Why was not the X-ray used in locating the bullet of the assassin, when it is known that a radiograph could have been taken in one minute? The use of the X-ray in the diagnosing of wounds has passed beyond the stage of experiment; it is now a scientific certainty, in the hands of the skillful and practical operators who were at hand; why did they, with this knowledge of facts, use as they did, the probe, and still refuse after their failure to locate, when the radiograph could have been taken, and, too, without pain to the illustrious sufferer?

It is more in sorrow than in anger, that we propound these pertinent questions. We cannot afford to neglect known certainties, because other methods have been the best known. It is due to the noble profession of medicine that we keep in line with the latest discoveries; and more especially as we deal with such wounds as were the result of crime's mad act. We hope that hereafter every one who is called to such duty as came to them, will not as they neglect to avail themselves of every known and valuable means at hand; nor let our fellows die without at least having it to say, "We did all that science could do to save." It may be that even had the X-ray been used, the noble sufferer would have died; but that does not change the fact that they did not use that which would have told in unerring way where the deadly missile was located, and if an operation was then performed it would not have been an experimental one, for with their known skill, there would have been directness, unattainable in any other way.

With this thought of neglect pressing upon us, we can but plead with our profession, that no longer they ignore this important means of diagnosis, for the eyes of the scientific world are upon us, and we will be judged by this world, just as we use, or neglect to use, each and every discovery of proven usefulness.

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SPECIAL REPORT TO T..E AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA.

The Roentgen Society of the United States held its second regular meeting Sept. 10 and 11 at the University of Buffalo. The society was called to order by the president, Dr. Heber Robarts of St. Louis at 10 a. m., and at once began to attend to business. It was moved and carried that the society hereafter be called *"The American Roentgen-Ray Society."* A number of minor rules and regulations were discussed and adopted. At the meeting on Tuesday p. m. a large number of scientific papers were read—one by Dr. Mitiran K. Kassabian of Philadelphia, Pa., "The Diagnostic Value of the Roentgen Rays With Special Reference to Their Application in Medico-Legal Cases." We make special mention of this paper as we believe it was most scientific and especially educational to the profession. Dr. S. H. Mo ell of New York city gave an interesting paper upon "Examining Frames and One-Minute Localizers," with demonstrations of the same. Dr. John T. Pitkin of Buffalo, N. Y., read a paper, "How the Induction Static Machine Can Be Excited Without a Separate Charger." He was followed by Dr. G. P. Girdwood of Montreal, Canada, who gave a paper on "X-Ray Work in Great Britain—Results of a Trip." Following this the inspection of exhibits took place.

Tuesday evening was to be devoted to the hearing of the president's address, Dr. Heber Robarts of St. Louis, and the reading of other papers, but after the address of the president, which was well received, Mr. Julius Silversmith of Chicago began the reading of his paper as per programme, but it was of such character that there were repeated interruptions and such disorder that the further reading was stopped, and it was voted that it should not be accepted nor allowed to be printed by the society. Order was restored by the reading and discussion of a highly scientific paper by M. U. Dr. R. Jedlicka of Prague, Bohemia, on "Skiagraphy of the Concretions in Urine, especially Cystine." The meeting then adjourned until the following morning.

On Wednesday morning the annual election of officers took place. A new executive committee of three was first chosen, consisting of Dr. James P. Marsh, Troy, N. Y.; Dr. W. W. Johnson of Rochester, N. Y., and Weston A. Price, D. D. S., M. E., of Cleveland, O.

Dr. Price, a member of this committee, requested the writer of this report to distinctly mention that hereafter members will only be accepted by this society after being duly recommended by two competent and well-known professionals or members of the society. He furthermore stated that it is the intention of this committee to investigate all such physicians who advertise or seek publicity in daily or other public papers, and that we may safely state that such members will be expelled, so that we may have only the best material in the society and allow men of good standing only the prestige of membership. In the election of officers for the current year the following were chosen, viz.: President, Dr. G. Prout Girdwood, Montreal, Canada; secretary, Dr. James Bell Bullitt of Louisville, Ky.; treasurer, Dr. E. A. Florentine of Saginaw, Mich.

After the election of officers Dr. Heber Robarts offered to the society "The American X-Ray Journal." It was, however, left to the executive committee to decide whether with its means on hand it would be able to publish a monthly issue as its official organ, but a unanimous vote of thanks was extended to Dr. Robarts for his offer of good will. Papers were then read as follows: "Why Some Mistakes Were Made in Radiography," by Dr. J. N. Scott of Kansas City, Mo., a paper which was well received and thoroughly discussed; by Dr. Elmer G. Starr of Buffalo, N. Y., a paper, "Description of a Simple and Efficient Form of Electrolytic Interruptor," followed by a paper by Dr. H. P. Pratt of Chicago on "Value of the X-Ray as a Therapeutic Agent." This paper was interesting inasmuch as that Dr. Pratt claims priority in the use of the X-ray as a therapeutic agent. The meeting then adjourned to 1:30 p. m.

In the afternoon session the executive committee was instructed to draw up short rules and regulations for the use of the society, and it was decided that no paper be read except by title unless by the author of the paper. A paper by Dr. Emil H. Grubbe of Chicago, entitled "The X-Ray Tube," was presented, and by the rule was "read by title." This was followed by a paper on "Developments in Crooke's Tubes in 1901," by Mr. H. Westbury of Harrison, N. J.

The following resolution was introduced by Dr. H. Robarts, former president of the society:

"Resolved, That this society assembled express its deepest sense of sorrow for the recent affliction inflicted upon our President, William McKinley; that our society has profound confidence in the wisdom and ability of the surgeons in the charge and condemn any and all unkindly illusions that have unfortunately been publicly and privately expressed concerning the uses of the Roentgen Rays, relying, as we do, on mitigating circumstances known to the surgeons only.

"Resolved, That a copy be stricken off and sent to Dr. Roswell Park, a member of this society."

Dr. Park, who was consulting physician at the bedside of the President, was present and briefly addressed the convention. He expressed regret that he was too busy to attend the previous meetings. He stated that he was not blind to the value of the X-rays, but as the bullet was now causing no fear, no decision had, as yet, been made to discover its location.

Dr. Park's remarks were of short duration, but nev-

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ertheless interesting, and loudly applauded. At the conclusion of Dr. Park's remarks the resolution was unanimously adopted.

Following the adoption of the resolution a paper was read by Dr. W. A. Price of Cleveland, O., upon "The Efficiency of X-Ray Generators," which was of great value and ably discussed.

Then followed discussion upon next place of meeting.

In view of the large representation of members in the West—from Michigan, Wisconsin, Iowa and Illinois—and the able efforts of representatives of the Chicago Electro-Medical Society, who were present, Chicago was favorably considered, but the final decision was referred to the executive committee.

We may say, however, that the writer was assured by two of that committee—Drs. Price and Marsh—that their choice was Chicago. After this reference to the committee the meeting adjourned.

We may say in this connection that the X-ray workers of the United States were well represented, the sessions were well attended, at no time were there less than one hundred present at any of the meetings, and we are sure of the continued growth of the society, and especially under the able direction of those who are its officers.

REPORT OF DISCUSSIONS HELD BEFORE THE CHICAGO ELECTRO-MEDICAL SOCIETY, AUG. 27, 1901.

By Prof. Charles H. Treadwell, Drs. H. P. Pratt, G. G. Burdick, T. P. Hall, E. H. Grubbe.

The topic for discussion was the list of suggestions of Dr. Monnell concerning the standardization of X-ray apparatus and technique. The list was published in the X-Ray Era of last issue.

It was suggested that Mr. Treadwell open the discussion on the first topic, the nomenclature of the X-ray phenomena. He stated he preferred to call the radiation which proceeds from a Crooke's tube the Roentgen Ray, because it was no longer an X-ray, since many of its properties had been discovered and its nature more definitely known. The X-ray picture should be called a radiograph, because produced by radiation. The term X-ray picture is too clumsy. The term shadowgraph is poorly formed from the standpoint of philology, shadow derived from the modern languages and graph from the Greek.

Dr. Pratt objected to the term radiograph and preferred shadowgraph or X-ray picture, because radiograph implied a radiation proceeding from the tube, but not returning to it. He held that the X-ray is similar to any electric circuit excepting that its potential is higher than that of any other circuit. It starts from the outer surface of the Crooke's tube, which is positively charged, extends out into the surrounding space and returns to the inside of the tube, which is charged negatively.

Dr. Burdick held that while the term radiograph was to be preferred, it would never come into common use and would not be intelligible to the ordinary jury, whereas the term X-ray picture was in general use. He held that the radiation was still an X-ray. In the course of the discussion Dr. Pratt stated that Roentgen's real work was simply to use the photographic plate and obtain an X-ray picture of the hand, for Lenard had obtained these same rays several years before. Mr. Treadwell called into question the accuracy of the statement, holding that Lenard's rays were the Cathode rays which he let out of the Crooke's tube by a thin aluminum window. These rays were not the X-rays, because they could be deflected by a magnet and had the other properties possessed by the Cathode rays. In reply Dr. Pratt stated that the difference between the X-ray and the Cathode ray was one of potential alone.

Dr. Hall was called upon and stated that the ray was a radiation. The term shadowgraph is a misnomer, since the word means the shadow writing its picture on the photographic plate, while the reverse is the case. He stated that Lenard obtained probably some feeble X-rays along with the Cathode rays, but the phenomena was not thoroughly investigated, and the X-ray awaited the discovery of Roentgen.

Dr. Burdick spoke on the distance of the tube from the plate. By caliper measurements of the long bones and comparison with the photograph he concluded the distance should be 20 inches. At a smaller distance the bone was enlarged at a greater distance the photograph of the bone was made smaller because the rays seemed to pass in behind the bone. Dr. Grubbe discussed the same topic and stated that in chest pictures he had obtained good results at both small and greater distances.

Dr. Burdick held it would be impossible to standardize a fluoroscope as to materials contained. He stated he had found a considerable per cent of uranium in a platino-barium-cyanide screen he had analyzed for Mr. Friedlander. The necessary qualities of a fluoroscope are evident and need not be discussed; the standardization of tubes, tube holders, etc., is a matter for the manufacturers.

Secretary's Report of the August meeting of the Chicago Electro-Medical Society, held in club room of the Palmer House, Tuesday evening, Aug. 27:

In the absence of the president, Dr. S. V. Clevenger, Dr. G. G. Burdick acted as chairman, and Dr. Emil H. Grubbe as secretary.

On motion of Dr. H. P. Pratt, Dr. Grubbe was voted permanent assistant secretary of the society. Moved and seconded that at the next meeting of the society two principal papers be read. One upon some electro-theraputic subject, and one upon some X-ray subject. Carried. Upon suggestion, Dr. Baer agreed to read

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the paper on electro-therapeutics, and Prof. Treadwell the theories pertaining to the X-ray.

The secretary then read the minutes of the previous meeting. On motion the minutes were accepted as read.

Moved and seconded, that the next meeting be held the last Tuesday evening in September. Carried.

Dr. H. P. Pratt proposed to give the society the use of his office (1101 Masonic Temple) for the evening of the next meeting. Accepted.

The society being charged $5 by the Palmer House for use of the club room, on motion, the secretary was instructed to issue a warrant on the treasurer for five ($5) dollars to pay said rent. Carried.

The secretary was instructed to consult with the manager of the Sherman House for the privileges of the hotel club room as a permanent place of meeting for the society.

The secretary then read Dr. Monell's letter upon "Standards" to be decided upon at the Buffalo meeting (Sept. 10 and 11) in respect to correct nomenclature in X-ray work, after which discussions were considered in order.

In the very interesting and instructive discussion that followed the following named took part: Dr. H. P. Pratt, Dr. G. G. Burdick, Dr. E. H. Grubbe, and Profs. Hall and Treadwell.

Moved and seconded that the secretary be instructed to write the Roentgen Society of the United States, asking it to appoint a committee to investigate and report as to who was the first person to suggest and apply the X-ray as a therapeutic agent. Carried.

The following names were submitted for membership in the society: Dr. T. P. Hall, Dr. W. P. Coones, Dr. Walter M. Fitch.

Meeting adjourned 10:15 p. m.

EMIL H. GRUBBE, M. D., Asst. Secty.

X-RAY DERMATITIS.

Dr. M. M. Sharp of London says: In the early part of this year (1901) I had four cases under treatment—one psoriasis, two lupus and one epilation. I was using a 12-inch coil on the 100 volt alternating circuit, with a Caldwell electrolytic break. My tube was never under 6-inch spark and towards the end had gone up to 7.5-inch. The cases had all been under treatment several weeks, were making satisfactory progress and showed no signs of dermatitis. They all showed the characteristic "brown staining." When the vacuum of the tube had got so high that I had difficulty in getting the current across, I changed it for one with a spark of 4 inches, giving very much less of green rays and a visible stream of violet rays from the cathode. Within ten days every one of the cases had dermatitis. There can be no doubt that it was caused by the comparatively low vacuum of the tube, as the details of the operation were not changed in any other respect—besides, this same tube, with a spark length increased to 5.5-inch and no violet rays, is now doing good work, without any accompaniment of dermatitis. I had never used before a tube in which violet rays were visible with green rays, and I had never before had a case of dermatitis in my own practice. I have been asked whether the advantages of a soft tube in treating skin affections are enough to counterbalance its dangers. Since the beginning of this year I have had opportunities of comparing the actions of soft and hard tubes on the same subject, and my judgment is in favor of the hard tube. This is contrary to my previously expressed opinion, but is, I think, justified by my more recent experiences.

Archives of London Roentgen Soc.

"NOTHING TO DO WITH THE X-RAYS."

In some of the morning papers of Friday, Sept. 13, there was an account of an explosion of a tube of nitrogen, in connection with X-ray work in the Chicago Opera House building. It is true there was an explosion; but it was not in any X-ray work.

"The tube that was being filled with nitrogen was a small one, but it did enough damage," said Dr. Wheeler. "It was a tube for storing nitrogen gas, and had absolutely nothing to do with the X-ray machine. I was not watching the work of the chemist at the time of the explosion. He had been storing nitrogen gas a good part of the day, and I did not anticipate any danger. I think in some manner a spark must have reached the gas. The force of the concussion was something remarkable. It is a wonder that we were not more seriously hurt."

We make mention of the accident therefore, to correct any erroneous impression that may have gone forth as to its being connected with the X-ray apparatus. In a personal visit to Dr. Wheeler's office we saw that though the effects of the explosion were apparent almost everywhere in the room, the static machine he was using in his X-ray experiment was uninjured.

Dr. James of New York said before the Medical Academy of that city that not only specialists and hospitals, but all practical physicians, should have X-ray apparatus; and that the trouble and cost in connection with the same would amply repay itself by the scientific knowledge gained therewith.

In the August number of the *Electro-Therapeutist* several cases are reported by N. H. Chamberlain, M. D., of Oakland, California, on "The X-ray Treatment of Cancer," one of which is illustrated by cuts showing the condition of the face before the X-ray treatment, and the appearance of the face five months afterwards. The whole article is worthy of attention.

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TO HEIGHTEN THE RESULTS IN X-RAY WORK.

Before the Physiological Society of Berlin, Feb. 22, 1901, Dr. E. Grunmach of that city gave a report of his new method by which to heighten the results of X-rays in connection with Aktinoscopie and Aktinographie. Dr. Grunmach saturated a fine linen screen with dissolved uranum combines, which he used in the following manner: "If there is placed behind the person who is to be experimented with a great thick lead plate with a central cut-out of about eight to ten inches, and behind this lead plate and Dr. Grunmach's prepared screen, and between this screen and his especially constructed vacuum tube a large lead sheet. As soon as the action of the current takes place, then the Baraim Platinum Cyniade screen, which is held before the person to be experimented with, will reflect the penetrating parts of the body in lighter, sharper and more definite pictures than has ever been seen before. Also that instantaneous Aktinographs so taken are exceedingly good.

This method is mainly of use in the examination of stout, heavy-set people.

We have upon our table two volumes on Electrotherapy, by Geo. W. Jacoby, M. D., published by P. Blakiston's Son & Co., 1012 Walnut street, Philadelphia. These are the first two of a series of a System of Physiologic-Therapeutics, edited by Solomon Solis Cohen, A. M., M. D., professor of medicine and therapeutics in the Philadelphia Polyclinic, Jefferson Medical College, and physician to the Philadelphia and Rush Hospitals, etc. The volumes before us are printed on good paper, and the illustrations are very clear. In as much as we have read these volumes we can safely recommend them to all those interested in the study of of Electrotherapy.

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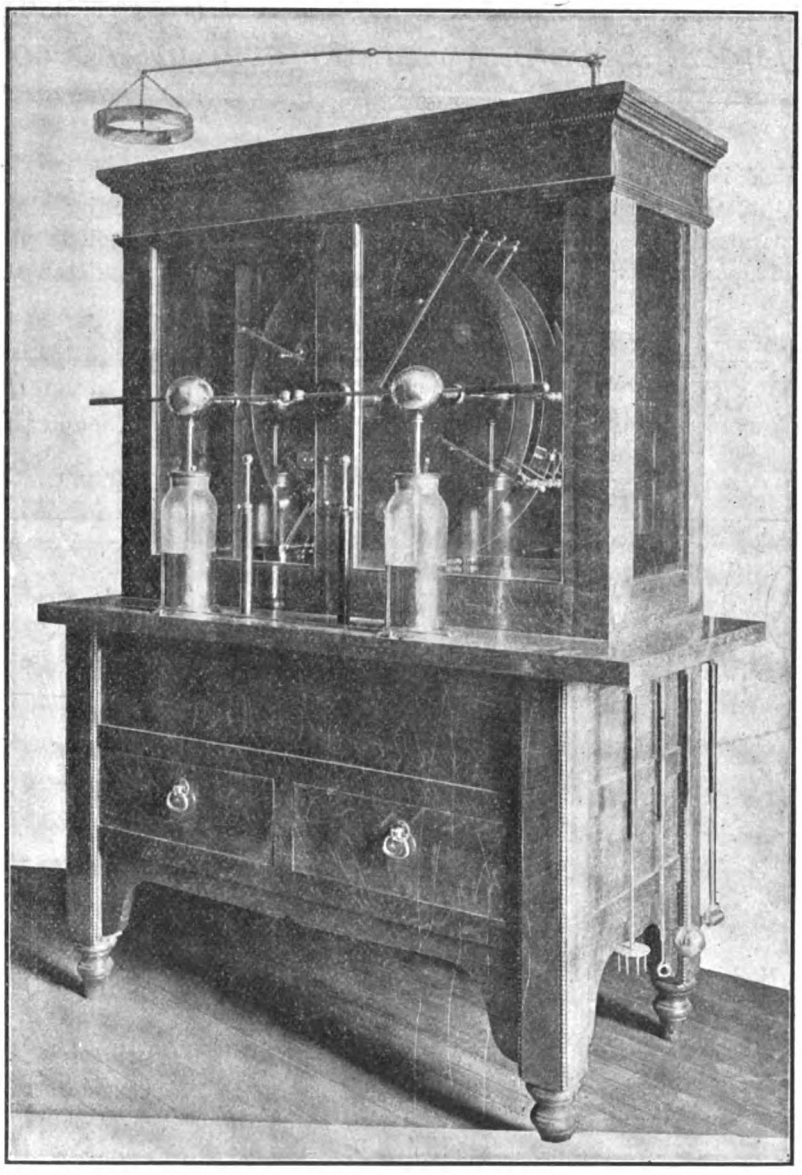
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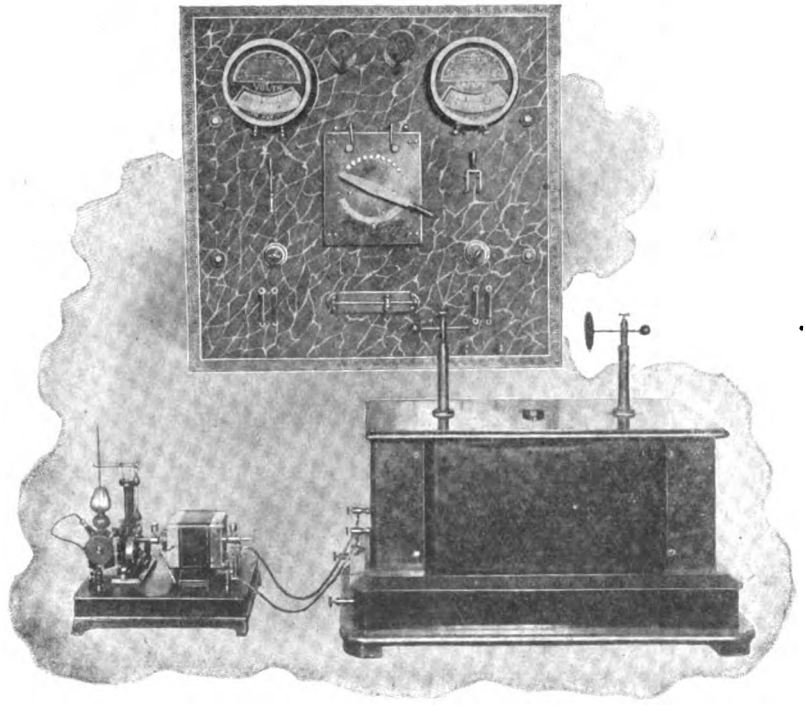
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AMERICAN
Electro-Therapeutic and X-Ray Era

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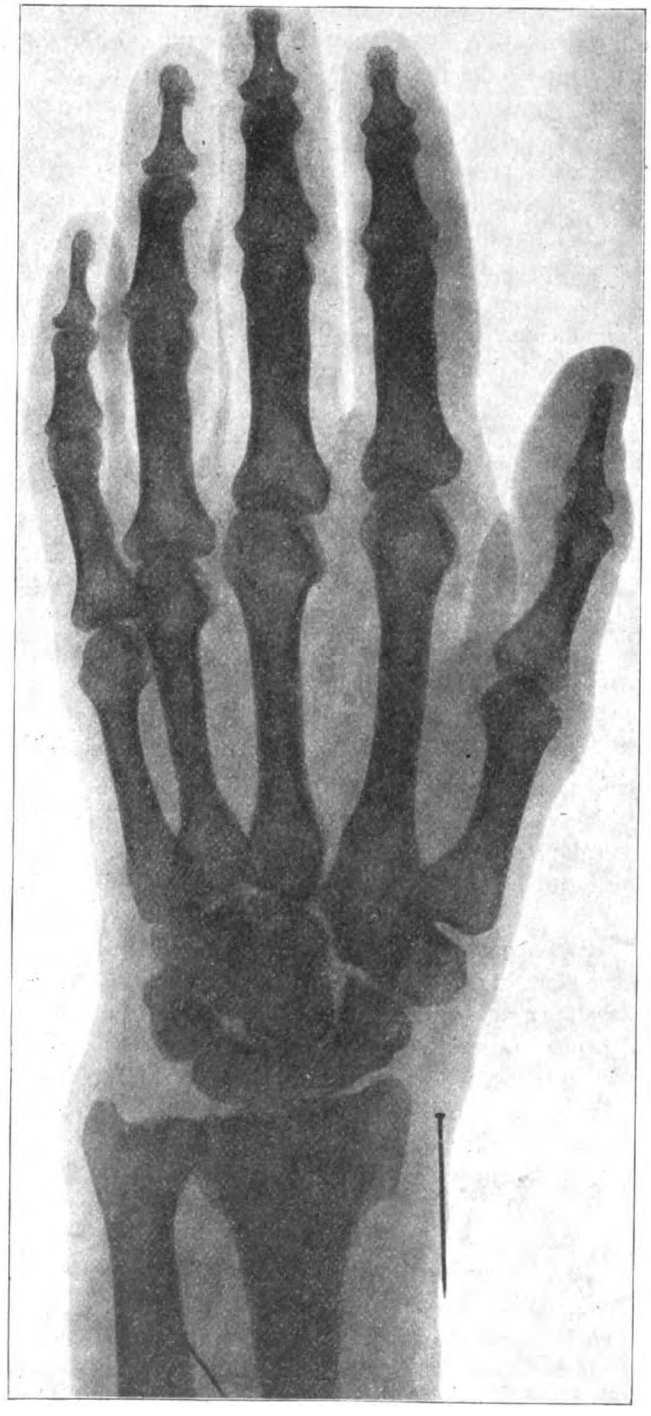
VOL. 1. CHICAGO, OCTOBER, 1901. No. 5

Special to the American Electro-Therapeutic and X-Ray Era.

A CASE OF COMMINUTED COLLES' FRACTURE.

Illustrated by Radiograph.

This communication is made for the purpose of illustrating the great value of the Roetgen Rays if properly used.



The patient, *Mrs. S. N., a slender lady of about thirty years, is a seamstress actively employed as the head of a private dressmaking establishment. She is of medium height, rather anaemic in appearance, but otherwise in good health. As a child she suffered for a year or more with hip disease, as a result of which the left lower limb is decidedly shorter and smaller than the right one. The left upper limb is also of smaller dimensions than the right one, the patient dating this from the time of the prolonged sickness just mentioned. The discrepancy in size between the upper limbs is less marked than that between the lower limbs. She has borne one child, a robust boy of seven years.

June tenth last patient met with a serious accident. While leaning upon a defective porch railing, the railing gave way and patient was precipitated head first into a basement stone steps with brick and stone side walls. The distance fallen was about fifteen feet. In addition to a severe contusion of the right hip and left forearm, two lacerated wounds of the forehead and face, she suffered a fracture of the right radius. The shock to the nervous system was quite severe.

The writer attended the patient very soon after the accident had happened. One centigramme (one sixth grain) of morphine was injected subcutaneously, after which chloroform was carefully administered. It was found that there was no fracture of the pelvis nor the right lower limb, nor of any other bone save the right radius. The wounds having been antiseptically cleansed and saturated the attention was turned to the right forearm, which interests us here.

The characteristic symptom of Colles' fracture—dislocation á la fourchette—was present in an exaggerated degree. The relative positions of the styloid processes of radius and ulna, also the deviation of the flexor tendons with the dislocated part excluded the very seldomly occuring dislocation of the carpus dorsally without fracture. Upon a more careful examination bony crepitus was readily elicited, which made a fracture certain. For the short time that had elapsed since the accident the swelling was marked.

The patient was brought to her right side of the bed, the right upper limb overhanging the side. The elbow was flexed to a right angle and counter extension made by means of a towel thrown about the arm above the elbow. Facing the right side of the patient the left hand firmly grasped the lower third of the forearm,

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which was midway between pronation and supination, the right hand clasped the patient's hand (hand shake) in such a way that upon extension traction would fall mainly upon the radial half of patient's hand. Extension with pronation, abduction and slight radial rotation failed to completely reduce the fracture though crepitation was very marked. To reduce the fracture pressure upon the affected parts with the left hand was necessary while the right was making strong extension. Reduction having been completed and there being no tendency to dislocation as long as the hand was properly extended, a plaster cast bandage was applied. The usual routine was followed—cotton, roller bandage, plaster. An extra thickness of cotton was laid over the back and radial margin of the fractured epiphysis so that when the roller bandage had been put on the appearance was that of a dislocation before reduction. While the bandage was applied extension was left to a lay assistant who held the thumb with his right hand, palm with his left hand, the position striven for being abduction, pronation with a slight radial rotation. While the plaster was setting *strong extension* was made. The elbow joint flexed at a right angle was also immobilized. The patient was left in a horizontal position, the forearm elevated almost to the verticle.

The bandage caused neither pain nor discomfort. As soon as the erect position was tolerated by the patient in that the symptoms of shock had disappeared, she was taken down to W. Scheidel & Co., 171 E. Randolph street, for the purpose of making an examination with the Roentgen rays. A fluoroscopic examination through the cast proved unsatisfactory, therefore a radiograph was taken. This was also somewhat indistinct, presumably because of the thickness of the cast, and though it showed the position was a good one, in that the accident might possibly be the cause of legal proceedings, it was decided to take another radiograph with removed plaster cast. This was done, the result being the beautiful picture here reproduced.

The cast having been removed, the patient was instructed to lay the hand upon the plate in a quite natural position, without in the least arranging it. The joint being free, no pain at all being felt upon making light movements, there being no swelling, it is reasonable to conclude that the view is one of a hand in an unstrained, easy posture. The radiograph was taken with a twelve-inch Spark coil (W. Scheidel & Co.), the distance of the tube from the plate being twenty inches and the time of exposure twenty seconds. The picture shows, very elegantly, the difference of bony structure between epiphyses and small bones and the diaphysis of the long bones. The apparently large distance between the carpus and the head of the ulna is doubtless the result of the position, slight abduction of the hand. This position is such as to magnify the interspace. The distal epiphysis of the radius was completely severed from the diaphysis and furthermore split asunder by a longitudinal fissure. Possibly this fissure will account for the observation that the parts only kept the correct position after reduction, when strong extension was made upon the hand. The picture would furthermore show an impaction of the diaphysis. At the time the fracture was set and dressed this was assuredly not the case. It is possible that the elevation of the forearm during the first few days may have had something to do with it. Nevertheless the articulating plane of ulna and radius is not disturbed, nor does the distance of the radius from the ulna differ from the normal.

Without anaesthetic the plaster cast was again applied as at first, only that the elbow was left free and the portions of the bandage distal of the meta carpo phalangeal joints cut away. The free use of the fingers was encouraged. At the end of four weeks the cast was opened by a longitudinal incision, the hand daily taken out, movements made (passive and active), massage given and again replaced in the cast. At the end of the fifth week a slight bandage only was left on the wrist, the use of the hand for light movements being encouraged. The result is an excellent one, both in function and appearance.

Whenever possible the Roentgen rays should be used to determine the effect of an immobilizing bandage applied for a fracture. The fluoroscope will not be nearly so satisfactory as a radiograph where the negative is properly developed. The plate alone is, from the above experience, not so reliable. When as sharp a picture as the one here produced can be had by an exposure of a few seconds only, the inconvenience to the patient is nil, whereas the benefit to the surgeon is a great one, even though it be confirmatory only RUDOLF S. DUBS.

THEORIES CONCERNING THE X-RAY.

Paper read before the Chicago Electro-Medical Society, by PROF. C. H. TREADWELL.

Mr. President and Members of this Society: I shall take the liberty to introduce this paper by a discussion of the phenomena occurring in the discharge of electricity through gases at different pressures. I think this is essential to a correct understanding of the X-Ray. Let us imagine a cylindrical tube connected with an air pump having two (2) disk electrodes, sealed at opposite ends of the tube. When these electrodes are connected to an induction coil or static machine, a linear zig-zag spark will pass between the electrodes while the air pressure is one (1) atmosphere. If, now, pressure is gradually reduced by the air pump we shall note the different phenomena produced at various pressures. As the pressure decreases to one-tenth (1-10) of an atmosphere, the appearance of the spark does not change, but it is noticed that the

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voltage required to produce the discharge is decreased with the air pressure up to a certain critical value for each gas; after which, if the pressure is reduced the voltage required to produce the discharge must be increased. Even to one-thousandth (1-1,000) of an atmosphere, the spark is linear, but is attracted by a magnet, and if the discharge touches the sides of the tube the glass becomes phosphorescent. When this pressure is the one-millioneth (1-1,000,000) of an atmosphere there occurs "the Geissler" discharge. Near the negative electrode is a dark space, called the negative space. Beyond this is the negative glow, the color depending on the gas in the tube; nearer the positive electrode is the positive glow, consisting of luminous stratifications which seem to be moving rapidly toward the negative electrode; new ones starting from the positive electrode continually.

As the vacuum is further diminished by the air pump the dark space broadens out from the negative electrode and at about the millioneth of an atmospheric pressure fills the entire tube; the walls of the tube fluoresce vividly. If the cathode be made concave and a piece of metal be placed at its focus, the metal is soon heated red hot. If a screen of calcium tungstate is placed lengthwise in the tube, its entire length is made to glow by a discharge which seems to come from the cathode.

Crookes gave the name of "the Cathode Rays" to this discharge. He discovered that if the stream fall upon the arms of a light wind-mill, suspended to rotate within the tube, it will be set into rapid rotation. The rays may be bent by a magnet so as to fall upon the other side of the wind-mill, and will cause rotation in the opposite direction. If the rays fall upon a piece of metal its shadow is cast upon the walls of the tube. Such phenomena led Crookes to hold that the cathode rays consist of negatively-charged particles of the gas still remaining in the tube, shot from the cathode with great velocity. It is evident that a stream of charged particles would present such phenomena. But several German physicists, among whom was Lenard, obtained phenomena apparently impossible to a crowd of particles. The glass was observed to fluoresce under a piece of thin gold foil. It was hardly possible for particles of gas to proceed through a solid.

Lenard cemented a very thin piece of aluminum over a hole in a Crookes tube, opposite the cathode, and obtained the cathode rays outside the tube. He proved these to be cathode rays because they presented all the phenomena of these rays. For example, they could be deflected by a magnet; he therefore came to regard these rays as a kind of radiation in the ether. The majority of German physicists still hold to this view.

Soon after this Roentgen discovered the X rays. His attempts to prove it a radiation similar to light were not successful. Physicists are pretty well agreed that the X-rays cannot be made to show either interference or polarization.

The most of the German scientists consider this a kind of radiation in the ether, different from both the cathode ray and ordinary light. Roentgen and Boltzmann think the X-ray may be longitudinal vibrations.

From what is known of the properties of the ether, such a mode of vibrations is possible. Jaumann thinks the ray may be in part longitudinal, in part transverse. Others hold that the ray is transverse vibration like light, but of very much smaller wavelength. This would account for the failure to exhibit the properties of light.

The English school, led by Stokes and Thomson, have quite a different theory. They show that the quick stopping of the cathode streams of charged particles would set up electro-magnetic waves having the properties of the X-rays. These waves are not regular like light-waves, but are a series of impulses, each one of which is produced by the quick stopping of an electrified particle in the cathode ray. Indeed the X-rays originate when the cathode stream is stopped. Such a train of waves might well be expected to exhibit phenomena different from the regular vibrations of light. From this point of view the nature of the cathode rays is of fundamental importance. In 1897 Thomson published his researches on the cathode rays. From his experiments he is led to believe that he has measured not only the velocity of these particles in the cathode stream, but has determined their mass. He concludes that their velocity may vary in the different gases, but their mass is always the same, about one-thousandeth part of the mass of a hydrogen atom. He holds that the atoms of all elements are composed of these corpuscles, all having the same mass.

However attractive may be the view of Thomson, it seems to me that we must be conservative in its acceptance. We must rather be content to recognize the fact that there is not sufficient argument among physicists to accept any of these theories.

Discussion of the above paper followed. Dr. Grubbe said that the view held by Roentgen presented the fewest difficulties; the X-ray may well be considered a longitudinal vibration of the ether.

Dr. Pratt was then called upon to explain his theory of the X-ray, which he did very clearly by illustrations upon the blackboard.

He regards the X-ray as an electrical circuit, starting from the exterior of the tube, extending through air and back to the inner part of the tube by means of the terminals.

Considerable discussion on Dr. Pratt's theory followed. Mr. Treadwell opposed the theory and Dr. Hall held that it might serve as a working theory inasmuch as it explained the phenomena in a very simple manner.

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SOLAR RETINITIS.

Paper read by A. W. BAER, M. D., before the Chicago Electro-Medical Society.

R. L., aged 18, born in Kentucky. Seventeen months in the Philippines, where he contracted Solar Retinitis. Was returned invalided January, 1901. Examined by physicians in San Francisco, St. Louis and Nashville, who informed him they could do nothing.

On examination I found him physically A1, except his eyes, which gave 15/160 vision in both eyes. +1.00 glasses gave him 1/120 vision O. U.

One static treatment gave him 1/120 vision O. U.
Three static treatments gave him 15/80 vision O. U.
Seven static treatments gave him 15/60 vision O. U.
Eight static treatments gave him 15/50 vision O. U.
Eleven static treatments gave him 15/40 vision.
Thirteen static treatments gave him 15/40 +.

A pair of plain smoked glasses were now added to keep off the glare of the sun. I promised this boy that in two weeks of treatment I would enable him to go out and earn a living; to say that I succeeded you have only to look at the figures from 15/160 vision to 15/40 + in two (2) weeks, is certainly more than I expected. He will continue to improve from now until he is fitted with lenses to correct all his errors of refraction, which I will have done when he returus to the city.

The manner of applying the current in this case was by a "make and break" static breeze, the patient breaking the current by raising his feet from the copper plate and replacing them with regular motion. Treatment continuing for from ten to fifteen minutes, winding up by using a heavy spark for one minute. General galvanization was used also two or three times—usually once a week—while treatment continued.

I report this case, as many who have served in the Spanish war and the Philippines are afflicted more or less by this disease, induced doubtless by the glare of the sunlight upon the water, in the same way as is so frequently experienced in what is commonly called "snow-blindness." The therapeutic effect is a toning up of the retinal nerves, as well as removal of their inflamed condition.

403 Security Bldg., Chicago.

WHAT ARE THE X-RAYS?

Prof. Trowbridge of Harvard University says in the Scientific American: They are now believed to be by our best authorities, magnetic and electrical pulses, or waves of motion of extremely short lengths. In the spectrum formed by sending a beam of light through a prism of quartz, the X-ray pulses, or waves, seem to be located beyond the violet rays of the spectrum. "The ultra violet rays, invisible to the eye, have the property of refraction—may be bent out of their course by prisms made of quartz; but the X-rays cannot be directed from a straight course." For this cause, it is argued—and from the formation of the Crook's tube—that it is electrical in its character, rather than as some would have it, "a light quality." The Crook's tube consists, as we know, of a bulb of thin glass, exhausted of air; containing a little concave mirror of aluminum, and opposite this mirror, separated by a gap of several inches, is an incline plane of thin platinum, called "the anti-cathode." The electrical discharge passes between this plane and the mirror, and the "X-rays" are thrown off from the inclined sheet of platinum. He says: "They are not 'reflected,' in the ordinary sense of the term, but the electric charges converge from the mirror to a spot on the platinum, which glows with a red heat, and the X-rays emenate from the electrically heated spot, as if it was their source." He also states that the Crook's tube is "in principle an Edison lamp, with the filament broken." Again, in speaking of the ordinary use of the coil, in exciting the tube, he adds: "It has been discovered that certain substances, like salts of uranium, have the power of emitting rays which have seemingly all the properties of the X-rays—such substances are termed 'radio-active';—and he asks—'cannot it be possible that all the skill and industry employed to perfect X-ray apparatus will eventually be supplanted by a powder?'"

This we have quoted refers of course to the securing of a radiograph; rather than to therapeutic effects, though "the Finsen theory" of therapeutic values in "Light" rays may be applied perhaps to the X-ray, as a component part of the spectrum analysis.

That the X-ray is an electrical phenomenon is seemingly, however, supported by the fact that in a dark room it presents all the auroral appearances of what we familiarly call "the Northern Lights"—the streamers, etc.—and furthermore, "these rays separate the air into positively laden and negatively laden particles," says Prof. Trowbridge. One of the most striking effects of the X-rays consists in their opening a path for a current of electricity. "The electrical discharge, feeble in itself, and not capable of lifting by means of a motor a pound weight, a foot from the floor is yet competent to open a path for a current which can set all the trolley cars of a city in motion," says one of our most practical electricians. He says: "We have here in the X-ray the mechanism of an electrical relay—the feeble energy of the electrical discharge through the tube can call into play a giant energy; it compels the molecules of air to put themselves in line and so bridge the gap."

Another far-reaching manifestation of the potency of the X-ray is this: These X-rays can separate the air or a gas into its constituent particles, much as a strong electrical current separates water in oxygen and hydrogen—they can communicate electrical charges to these particles—positive and negative charges.

Prof. Trowbridge says, remarking on these ascertained facts: "This curious manifestation leads me to

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suspect that the electricity and magnetism of the earth may be an X-ray effect on our atmosphere—the sun and the earth are separated like the terminals of a Crook's tube—two conductors with a vacuum between —an electrical excitation from the sun causes a discharge through vacuum, as in the tube, between it and the earth, and so produces the various phenomena with which we are acquainted."

It seems to us, in view of these known facts of science, that we have at least in them a key with which to solve our problem. And, too, it places the X-ray strictly in the list of electro-therapeutics, for if these we have quoted are reliable in their statements of phenomena, the X-ray is an electrical "ray"—possesses electrical potentiality and must be treated as an electrical agent. It opens to us, though, a still wider field of investigation than that of therapeutics—no less than world-wide. For ourself we may say, that for years we have been satisfied that the time is surely coming when what we—following Newton—have called "gravitation," will be named by science as electric-attraction, and know that the earth itself is governed in its pathway 'mid the stars, by the same electric laws of attraction and repulsion that govern the little "pith-balls" of our experiments in the laboratory of the class-room in our study of philosophy. Seeking the key to the solution of the X-ray, it may be we will find also the key to the vast and varied phenomena of the universe.

LIGHT AS A HEALING MEDIUM.

According to the oldest traditions of humanity the light appears as a good beneficent medium, and we can trace back the assertion that light has healing power to the earliest days of science. The light through the medium of the retina (or sensitive skin of the eye), acts on our nerve system. However, what we commonly call light or sunlight is not a unit, but composed of three different kinds of rays—viz., heat rays, light rays and chemical rays. The latter, although not perceptible to the eye, creates, nevertheless, many agreeable and disagreeable effects, which prove to us their existence in a somewhat roundabout way. For instance, it is very annoying to us when a costly dress loses its color (fades), a process directly traceable to the rays of the sun, but, on the other hand, these very same rays are of the greatest importance in photography. Even on our own body we can study their effect, for if we return "sunburnt" from our vacation, we should not ascribe this fact to the heat rays of the sun, as the name "sunburnt" would imply, but directly to the "chemical rays." The most important qualification of these rays, however, consists in their ability to kill bacteria, and these small beings are frequently the roots of serious maladies. We know that the interior of our body cannot be penetrated by these rays, but in a case where our skin is infested with bacteria, treatment with such rays will heal up the eruption. To Prof. Finsen of Copenhagen should go the credit of having made the first researches in this direction. Amongst skin diseases, caused by bacteria, Lupus Vulgaris is the most important one, because its spread is far-reaching, frequently playing terrible havoc, and many a face has been spoiled forever by its ravages. Prof. Finsen directed his first experiments toward overcoming this devastating tuberculosis of the skin, and the results which he obtained were so encouraging that lately an institute for treatment with light on the Finsen system has been inaugurated at the University of Berlin.

When treating a patient the sunlight should be collected in a big lens and concentrated upon the diseased part, and in order to make the ultra-violet rays more effective a hollow lens is used, filled with a blue liquid. For massage a crystal capsule is needed, with a continual stream of cold water coursing through it, which serves to abduct the heat emitted by the rays. Crystal is used instead of glass because it allows more chemical rays to pass through. It is absolutely necessary that this capsule remains pressed to the skin during every treatment (occupying almost one hour's time), and it is advisable to apply a rubber band to hold it in position. It was also found necessary to provide a nurse for every patient.

If electric arc light is substituted for sunlight, arc lamps with an aggregate of 40,000 cp. are needed. The rays are concentrated through the medium of a crystal lens as described above, also the water-cooling device mentioned is applied. Patients as well as nurses have to wear spectacles as protection against the intense light.

NOTES ON THE TREATMENT OF LUPUS WITH X-RAYS

By *C. Thurston Holland, M. R. C. S., L. R. C. P.*

In the May number of *"The Archives of London"* for 1899, I published a case of lupus of the face treated and cured for the time being by X-rays. Until May, 1900, the case remained quite well, i. e., for a period close on two years. Then there was a distinct recurrence of the disease, and in two parts, (1) at the lobe of the ear, (2) at the lower extremity of the scar close to the chin. These two parts became slightly scabby and inclined to ulcerate, the central scar area remaining quite healthy. Between May 9 and 21 I exposed the area again to the X-rays six times for ten minutes each time, using a 10-inch coil with a mercury interrupter and a high vacuum tube, an E. M. F. of 12 to 13 volts and 6 to 6½ amperes, the tube being distant from the skin about 6 inches. On July 24 the lupus was again cured, except for a slightly suspicious patch just at the lobe of the ear, where it was a little scaly. The whole scar is very healthy looking, soft, non-adherent and non-contractile. The lupus remained well until early in the year 1901, when the disease again returned, not only at the lobe of the ear, but in scattered nodules,

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here and there over the scar area. The case is now under X-ray treatment.

On Feb. 5, 1900, there came to me J. C. ——, female, aged eight years, with a lupoid patch on the left side of the face three-quarters of an inch below the eye, almost circular, and slightly larger than a half-penny; it was ulcerating and scabbed over with a very thick scab, from the edges of which pus welled out, and the ulcerating edge was nodular. The lupus began previously in a small pimple after an attack of measles, and was treated with ointment. Then at intervals it was scraped, under chloroform, on three occasions. It never healed after these operations, but "looked better" for a time. No further treatment was adopted until August, 1898, since which time it has been cauterized four times by a medical man, the last time being six months ago. It has gradually been extending more rapidly during the last eighteen months. On Feb. 5, 1900, having stopped all other local treatments, I commenced X-ray treatment. Between Feb. 5 and 17 it was exposed six times (through a shield of tinfoil) for ten minutes each time to a discharge of X-rays from a 10-inch coil, worked with a mercury interrupter. A high vacuum tube was used at a distance of 4 or 5 inches from the subject. The current was one of 12 volts and 5 amperes, with a spark gap of from 8 to 10 inches. On Feb. 17 a slight red blush was noticed round the scab, and treatment was stopped, and on March 15 the scab fell off and left a healthy looking, unhealed ulcer. On May 18 this ulcer was almost healed, but two small patches looked a little scabby and suspicious. Between May 18 and 23 she had four more exposures of 10 minutes each, under the same conditions as previously. On June 21 it appeared to be quite cured and still remains so.

In considering the treatment and its results with the above cases before us, there are several points worth dwelling upon. (1) It is not necessary to set up any initial effects, such as dermatitis, etc. In the first case no protection was used for the healthy skin, etc., surrounding the lupus, and half-way through the treatment a large patch of hair on the side of the head nearest the X-ray tube, fell out. The hair grew again rapidly. In the second case layers of tinfoil were used to cover and protect all the parts round the lupus. A red blush appeared in the healthy skin just round the patch, after six exposures, when immediately treatment was stopped for a time. And it is certainly sound advice to give, that on the first appearance of any inflammatory mischief, no more exposures should be made until it has quite disappeared. (2) In both these cases a very high vacuum tube was used at a distance of from 4 to 5 inches from the diseased area. The 10-inch coil was worked from a 6-celled accumulator, i. e., an E. M. F. of from 12 to 13 volts, and with 6 amperes, the actual spark being from 8 to 10 inches in length. This differs from the plan adopted by other workers, who have used a current of much smaller amperage, with a low vacuum tube and a smaller spark gap.

There does not seem to me to be any danger in using these stronger currents, and this leads me on to my third point, viz., (3) The very few exposures necessary to cure these two cases. The first case—and this was the first I ever treated in this manner—had only seventeen primary exposures of fifteen minutes each, and two years afterwards for a slight recurrence six more of ten minutes each. The second case had altogether ten exposures of ten minutes each. Perhaps the two cases are very suitable for this method of treatment, but at the same time the number of exposures are very few compared with other published records of X-ray treatment of lupus. (4) The fourth point is the gain to the patient. With this method there is no operation, no anæsthetic, no pain, and all these are most important from the patients' point of view. Further, the resulting scars, as seen in these two cases, are far superior to anything of the kind I have ever seen from any other treatment. Both are very soft, almost white, quite non-adherent, and with no tendency to contract, and when situated on the face, these points are of the utmost importance. In the second case, situated so close to the lower eyelid, by almost any other method, we must have had some dragging in the lower eyelid, which would necessitate an operation for its cure. It seems to me that in future, in all cases of lupus the X-ray treatment ought to be given a trial before any other methods are adopted. It ought to be the first thing recommended, not only in the bad cases which have been going on for years, but also in the very early stage of the disease, where certainly it would have a much better chance of not only arresting, but curing the disease. I do not think that in proper hands there is any risk at all to the patient from the so-called "X-ray burns," etc., while the gain to the patient in avoiding disfiguring operations, to say nothing of pain, and so on, is very great.

Archives of Roentgen Soc., London.

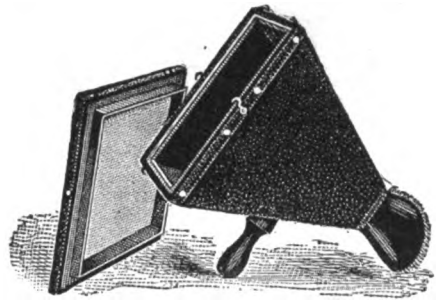
In "The Fortschritte auf dem Gebiete der Roentgenstrahlen" we notice a report of some results unexpectedly obtained in experiments before an audience with the X-rays that may be of interest to our readers.

An attempt was made to show in another room from the tube and through a closed door, a skeleton form, expecting of course, to throw the shadows upon the usual Barium-platinum Cynade Screen, but to the surprise of all, before the screen was in place, the shadow-picture was plainly seen upon the door, though not quite as distinct as it would be upon the screen. On examination it was found that the door had been painted with zinc white over two coats of paint—that the door had only been painted three times in 50 years, and that none of the coats of paint had been removed previous to the addition of a new coat, and the idea of the experimenters was that it was the zinc paint that gave the florescence. We note this, that further experiments may be made for the discovery of what may be a much cheaper screen than those now in general use.

NOTICE.

The next regular meeting of the Chicago Electro-Medical Society will be held Tuesday, Oct. 29, at 8 p. m., at 1101 Masonic Temple.

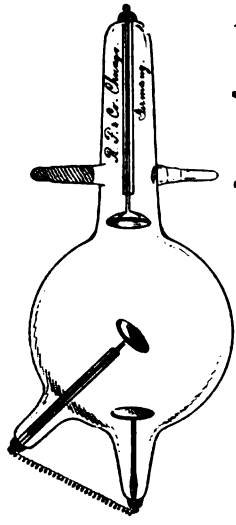
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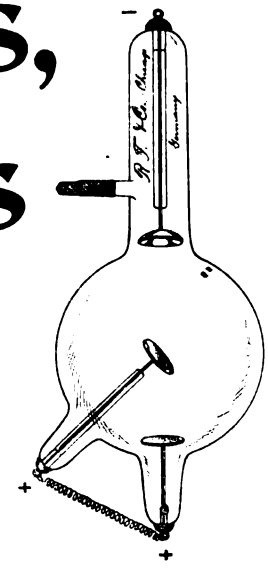
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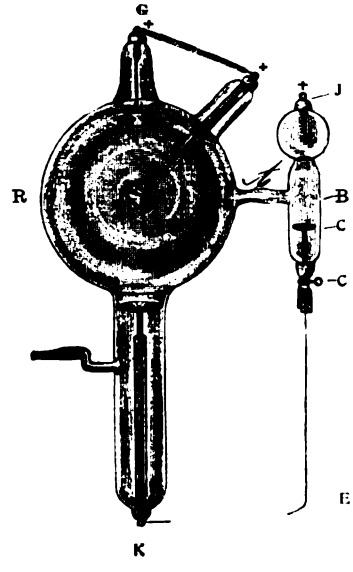
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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

TO OUR READERS.

The only thing that at present we can do is to say again the forces of nature, unexplored, is the storehouse infinite, from which the world of science can draw a new discovery. We can neglect our opportunity and so leave to others the glory of such discovery, but are we willing so to do? No, for we of all men are dealing constantly with disease, and each of us are custodians of the public health. So, then, it becomes a duty as well as a pleasure to investigate the natural phenomena of the universe, that as custodians we may offer to the diseased one health. Our paper is devoted to this end, and as you practitioners are our readers, we commend to your careful consideration the fruit of our gleanings from science. The only drawback is this: That often we are compelled to rewrite for the benefit of those who are beginners in the school of electro-therapeutics, lest some may overlook the primary principles, and then, by reason of this overlooking, they become discouraged by failures as they for themselves attempt the divine art of healing. But older ones also may need at times a refreshment of memory—we none of us are supposed to carry a whole library of knowledge with us at all times; only the index. So you of long practice will, we think, be gratified that monthly there will appear things new and old, that memory may be brightened. We sense, too, that memory needs this quickening, for often we forget to use it, and require constant jogging lest we, too, fail; not because we did not know, but because we forget! We said this was our only drawback; but at the same time we say that everywhere there is the presence of disease, and, like everything else in nature, we find diseases taking new forms, so that the form, unfamiliar, is a mask that covers the disease, and we need to unmask it, —then we would at once see the true nature of it and be no longer baffled by the new appearance. Today we add to our apparatus the X-ray, with its wonderful exposure of the whole system, but more than this, it tells with unerring certainty the nature of disease, as well as that we are finding it an efficient aid in therapeutics. So, then, our paper becomes to you, we think, a necessity. We hope to add to its value continuously, and, too, we hope that every physician will consider himself a contributor to its pages, as from time to time cases of note come, that we may, by recording them, add to the general knowledge.

MEDICAL JOURNALS.

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SECRETARY'S REPORT.

Meeting of the Chicago Electro-Medical Society held Tuesday evening, September 24, 1901, at Room 1101 Masonic Temple, State and Randolph streets, Chicago, Illinois.

Meeting called to order at 8:30 o'clock, Dr. J. E. Gilman, the second vice-president, in the chair.

Minutes of the last meeting read by the secretary. On motion they were approved and accepted as read.

Report of committees requested. Dr. E. H. Grubbe, committee on selection of permanent place of meeting, reported that he had been unable to see the manager of the Sherman House.

Motion by Dr. Grubbe that a committee be appointed to select permanent home for the society. Carried.

Suggested by Dr. Baer that the society meet at the laboratory of Dr. Pratt for the present, provided Dr. Pratt was willing. Dr. Pratt then extended his welcome to the society for as long a time as its members should see fit to accept his hospitality, but suggested that, in his opinion, it would be better to select a more public place for the meetings

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Dr. Burdick proposed that arrangements be made if possible with the Chicago Medical Society for the use of their club room one night a month. Motion that a committee be appointed for that purpose.

The chair then appointed the following committee, Doctors Burdick and Baer, to act and to report to the secretary as soon as possible so that the members might have due notice of the time and place of the next meeting.

On motion a report of the last meeting of the American Roentgen-Ray Society held in Buffalo, N. Y., Sept. 10 and 11, 1901, was read by the editor of the *American Electro-Therapeutic and X-Ray Era.*

Moved that the secretary be instructed to write to Dr. Pierce, the secretary of the American Roentgen Ray Society, requesting, in behalf of the Chicago Electro-Medical Society, that the next regular meeting of the American Roentgen-Ray Society be held in Chicago and to extend to them our most hearty welcome.

Moved that a committee be appointed to look up records and data in regard to the first use of the X-ray as a therapeutic agent and to place the credit of the discovery where it rightfully belongs. Motion lost.

The society then proceeded to the reading of the papers of the evening.

The first paper entitled "Three Eye Cases Treated by Electricity," was read by Dr. Baer. The paper was ably discussed by Drs. Burdick, Grubbe, Lewis and Pratt.

The next paper, entitled "Theories Pertaining to the X-Ray," was read by Prof. Treadwell. Drs. Hall, Grubbe, Burdick and Pratt took part in the interesting discussion that followed.

Dr. Pratt was then requested to illustrate and explain his theory of the X-ray, which he did in a very able manner. The discussion that followed the illustration was entered into by Prof. Treadwell, Drs. Lewis, Morrell and Hall.

At the request of the chair Dr. Morrell of Cincinnati talked for a few minutes upon a case of cancer which he was treating by means of the X-Ray. At the conclusion of the history of the case, Dr. Morrell requested the opinions of the members of the society upon the subject. A very interesting and instructive discussion followed by the society in general.

On motion the meeting adjourned at 10:50 o'clock, Tuesday evening, September 24, 1901.

RICHARD H. STREET,
Secretary.

THE PARASITIC THEORY OF CANCER.

Borrel gives an excellent if not exhaustive review of published articles on the theory of a parasitic origin for cancer, dividing his paper into three parts or specifications as follows:

1. "Parasites" described by Neisser, Darier and others, and believes that their "parasites" were epithelial cells undergoing special changes.

2. "Parasites" of the type describes by Thoma, Sawtchenko and others. These are intracellular bodies, round, single or multiple, occurring chiefly with carcinomatous epithelium of glandular type. These bodies show a superficial resemblance to certain stages in the development of coccidia. Borrel believes that these bodies arise from peculiar changes which occur in the attractive sphere and centrosome of carcinoma cells.

3. "Parasites" believed by some men to be blastomycetes. Borrel says that the men who believe in this theory have assumed that all sorts of cell inclusions with a circular outline are blastomycetes, while in fact the inclusions have no morphological likeness to blastomycetes, and the infinite variety of cell inclusions even in carcinoma cannot all arise in the same way. The objections to the blastomycetic theory are: The nodules produced in animals by inoculation with blastomycetes are, with the exception of two cases of Sanfelice (cf. *infra*), of mesoblastic type; most men, with decent asepsis in making cultures, do not obtain cultures of blastomycetes from carcinomata, and there is no evidence that yeasts are found within epithelial cells. Borrel analyzes Sanfelice's two "successful" cases and decides that there is no evidence that the tumors were due to the action of blastomycetes.

After this review of other writers upon this subject, Dr. Borrel's own view upon the theory seem to be almost a demonstration of the fact that bodies morphologically the same as the so-called "parasites" of cancer are produced in normal and carcinomatous cells by reason of certain peculiar changes in the attractive sphere and centrosome. In his own style of expression he speaks of specials in hardening and straining tissues. In the testicles of guinea pigs, the attractive sphere, and the centrosomes of cells which are to become spermatozoa he shows stages of development in which they resemble the so-called "parasites" that are seen in the cancer cells.

In the cells of carcinoma the attractive sphere with included centrosomes may give rise to exactly similar appearances. At times there comes a collection of portions of the sphere about each of several centrosomes, producing appearances like those seen in the "spore cyst" of various believers in the parasitic theory.

Hence, Borrel concludes that the so-called "parasites" are due to peculiar changes of the attractive sphere about the centrosome. He says that the theory of parasitic cause is attractive, but that at present there is no evidence to support any of the theories.

After reading Dr. Borrel's paper one can but feel that we are compelled to further investigation before pronouncing the parasitic theory established, even though there is so much of evidence in its favor.—Annals de l'Institute Pasteur.

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In the American X-Ray Journal for September we see one little item that we are somewhat surprised at, as our genial editor, Dr. Robarts, is so ready as a rule, to accord fairness. It is this: He speaks of the American X-Ray Journal "as the only X-Ray journal in this country!" It is true the *"American Electro-Therapeutic and X-Ray Era"* cannot boast of priority in this field of work, but surely we have obtained place and already earned recognition in the field, for we count subscribers from every state and territory, and have among our contributors some of the best and most advanced practitioners known to our profession. Think a little, dear doctor, and we will believe that you have been so long writing "only" that it was a slip of the pen—that you will correct—and not the intention of your mind.

We see that the Medical Council (Philadelphia) propounds to its readers among other questions the following: "What therapeutic agent is unique, the most promising, the slowest in developing, one of the least taught and yet fraught with possibilities that transcend imagination?" The answer to this question was as follows: "Electricity is the therapeutic agent that is unique, the most promising, the slowest in developing, the one least taught and yet fraught with possibilities that transcend imagination." That electricity is unique as a therapeutic agent is so self-evident that it needs no special elucidation. That it is the most promising of our therapeutic agents it must be conceded when its wide scope and general (almost universal) applicability is realized. This is also self-evident to electro-therapeutists, but not so to the bulk of the profession, who have not studied it in college and have had no opportunities for doing so afterward. There are practically four electric currents that can be used in the treatment of disease, each competent to do some special work that any of the other currents cannot do. They are the galvanic, faradic, alternating and static. With them electrolytic (chemic) changes may be induced in varying degree, from slight effects upon diseased tissue, without injury to normal structures, up to rapid destruction by the electro-cautery in operation work. Heart muscles or nerves and nerve tissue may be stimulated and local and general nutrition improved. Pain may be relieved and healthy processes induced in chemically diseased structures that defy every other known remedial method. It is the slowest of all remedies in developing because its teaching in the medical schools is usually but an incident in the teaching of nervous and mental diseases, a branch in which it is even yet not necessary to fully qualify for examination. After graduation few men seek to qualify themselves in its use for several reasons, among which may be mentioned the expense of equipment, the confused nomenclature of the subject and the delicacy required in electric treatment, failure to observe which insures negative or positively harmful results. The future of electro-therapeutics is fraught with possibilities that transcend imagination because of its wide range and variety of otherwise impossible effects. Take, for instance, the use of cataphoresis, or anodal diffusion, which is a better name for the process by which medicaments may be rapidly passed through the tissues to any point of the body without the aid of either the digestive or circulatory organs. Better known still, though of more recent date, is the extraordinary action of the X-ray.

Add, then, to these reasons the other well-established properties of electricity and consider that it is still in its infancy, and its future possibilities are evidently enormous and of transcending scope.

This from the Medical Council fully bears out our own suggestions upon this subject in our last number. The fact is, we are just beginning to know the uses of this basic element of nature's laboratory, and as we said, it is time that science, instead of empiricism, becomes the manipulator of the Joveic energies, possessing the powers of life and death, according to the skilled or unskilled use of them.

THINKS CONSUMPTION CURABLE.

PROF. BROUARDEL READS PAPER BEFORE TUBERCULOSIS CONGRESS.

The principal paper before the British congress on tuberculosis in July, 1901, was read by Prof. Brouardel of Paris, who urged international legislation in regard to the notification of the authorities of the existence of tuberculosis and the disinfection and salubrity of hotels, railroad cars and steamboats, thus preventing the spread of tuberculosis.

Prof. Brouardel, who is dean of the medical faculty of Paris, maintained that the disease is curable. He said any measures tending to limit the ravages of alcoholism would diminish the mortality from consumption and referred to the great danger in hawking pieces of meat in public places and in the sale of milk which had not been examined.

Prof. Brouardel believed these dangers could be remedied by legislation. The speaker said the measures needed for the prevention of tuberculosis were identical in every country, and the first step in this direction was to render unhealthy dwellings and districts salubrious. A healthy house, he said, was antitubercular.

Prof. Brouardel complimented the United States on its quick realization of the dangers of expectoration and on its legislation in the matter. He said once this habit had quite disappeared tuberculosis would decrease rapidly.

The September number of the Wisconsin Medical Recorder is well filled with interesting matter. We notice a clipping from our *American Electro-Therapeutic and X-Ray Era*, with due credit, and we shall dare to "go and do likewise," as the Recorder comes to us, for the magazine is worthy its place as a "Recorder" of medical progress.

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S. H. Monell, M. D., New York city, says: No surgical consulting room is fully equipped without an apparatus for X-ray examination. (2) The surgical practitioner will consult his own and his patients' best interests by employing an apparatus which is also of great therapeutic value. (3) The medical practitioner can most profitably utilize an electrical apparatus which is not only of prime electro-therapeutic importance, but which constitutes his most practical, economical and efficient source of X-rays. (4) The physician cannot obtain satisfactory X-radiance for all-round fluoroscopic investigation and short-exposure photographs with coils of low efficiency, and therefore, comparing effects with cost, such coils are a wasteful and nearly useless purchase. (5) The best coil of either simple of high-frequency type possesses drawbacks which will tend to eventually displace it in favor of more satisfactory apparatus. (6) the high-potential static current from therapeutic machines is superior to any coil known to be made at this date (February, 1897) in respect to economy, value, efficiency, satisfaction, reliability and almost all that pertains to the medical and surgical uses of X-rays in hospital and office practice. (7) No one can doubt these facts who witnesses repeated practical demonstrations of them, and such demonstrations are easily made by a skillful operator.

The application of the X-ray for medical diagnosis is quite as important as to surgical operations in my opinion.

Said a prominent physician of our city, while speaking of the X-ray in diagnosis, and also in respect to its therapeutic value: "I consider that it opens to us a new field, rich in discovery; and, too, I believe its action to be along electric lines, so that while I have not as yet introduced it into my own practice, I believe that in the near future we all will see the necessity of doing so. But," he added, "electro-therapeutics is yet in its infancy; we have even now, after the years it has been struggling for recognition, need to devote attention to almost what may be termed 'first principles' before we who are up to date in our own fields of medicine can be prepared for the astonishing claims that are set forth by those eminent men of both Europe and America, who have been at work along the new lines. Still I am willing to admit the possibilities of them, and also the probabilities, for these are careful observers and as such we must give them credit." We take care to note his words, for he himself is a careful experimenter whose name is well known in many therapeutic discoveries, both at home and in Europe. It shows that we of The Era are not working in vain; and should encourage every electro-therapeutist to present to the world his best work, nor fear at any time scientific investigation; for science must in the end be the final judge of all our efforts.

On Dec. 12, 1900, Dr. Amson demonstrated before the Berliner-Medical Society, by means of several radiographs, the results upon the patients of Dr. A. of a replacing, without loss of blood, of congenital hip dislocation, the replacing being performed by Dr. Wolff, who was guided in his operations by the showing of the radiographs, securing thereby almost ideal success in children of 15 months of age. In consequence of these successes, Dr. Amson recommends the replacing of such dislocations at the earliest age possible.

Dr. Everett Smith reports a case of Lupus vulgaris of fifteen years' standing (Buffalo Med. Jour.) successfully treated and cured by exposure to X-rays. The patient was a man, aged about eighty years, who consulted Dr. Smith May 3, 1900, for an ulceration of the nose and face, involving his right eye. It was found that he had a lupus patch which extended from the left side of the nose, going over the bridge, and involving the right side of the nose, the inner canthus of the right eye and the inner thirds of the lids, together with the bulbous conjunctira.

About fifteen years before he was slightly injured by a chip, which struck him on the bridge of the nose, breaking the skin. It never healed over completely, but slowly increased in size, notwithstanding he had been treated by a score of physicians, a few skin specialists and numerous quacks. About a year ago it involved the eye, and since then it had progressed more rapidly in the mucous surfaces. A mask was made for the face of sheet lead, a hole being cut for the nose and the diseased part of the eye, and with this on the patient was exposed about every fifth day for twenty minutes at a time, the diseased surface being placed about two inches from the light. He received in all twelve treatments. No medicine whatever was allowed. Marked improvement appeared after the second treatment, which was not interrupted until the sore was completely and entirely healed. After the second treatment healthy granulations appeared and healing was most remarkably speedy. There was no burning from the light or any other unpleasant symptoms complained of, except a slight headache and a decided "crawling sensation" in the sore from the first two treatments.

In Austria, by a decree, an official license is required before one can publicly operate an X-ray machine, and none but physicians are licensed. We see by this that already the scientists of the old world are awake to the danger of trusting the use of this mighty power of the X-ray to the manipulations of ignorance, and we of the new world should be equally awake. Electricity in any form in therapeutics needs the skilled and careful hand.

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BECQUEREL RAYS.

The preparations styled radio-active barium and radio-active bismuth refer to polonium and radium, respectively, compounds discovered by Madame Curie. By elimination and selection she isolated these from uranium and thorium ores, particularly the Bohemian pitch-blende. It requires several hundred pounds of this to obtain a few grains of the highest efficiency of radio-activity. When put in a small glass tube and covered, one end, with paraffined paper, they would emit invisible rays, behaving like the X-rays. Four inches from a plate, after thirty minutes' exposure, the shadow of the hand was observable, but not the bones. However, a piece of metal could be seen through the hand. The screen fluoresces with Becquerel rays, but too feeble for practical irradiations. F. Giesel, of Brunswick, has recently obtained in very small quantities slightly superior radio-activity.

NEW LIGHT CURE FOR LUPUS.

MANAGER OF COPENHAGEN LABORATORY CONSTRUCTS ELECTRIC LAMP RICH IN BACTERIA KILLING RAYS.

Dr. Sophus Bang, manager of the laboratory belonging to Professor Finsen, an inventor of light cure for lupus, has constructed a special electric lamp giving a feeble light, but which is extremely rich in chemical rays. Dr. Bang uses metal instead of carbon poles. The bacteria-killing power of these lamps is ten times as great as that of an ordinary lamp, and a lupus patient requiring seventy-five minutes' treatment with the arc lamp will require only from three to five minutes' treatment with the new one.

EFFECT OF X-RAYS ON PLANTS.

Very interesting experiments have recently been made at Cornell University by Prof. Atkinson on the effect of the X-rays on growing plants and seedlings. So much has been said of the injurious effect of these rays on the human body when exposed to them for photographic purposes, that Prof. Atkinson was prepared to see his plants seriously injured in the experiments; but the results showed that even delicate seedlings, after an exposure to the rays for many hours, were entirely unharmed. Sensitive plants like mimosa exhibited the same indifference. Among the photographs showing the interior structure of the plants were pictures of seeds of hickory nuts, almonds and peanuts taken through the unbroken shells, and of peas and beans still inclosed within the pods.

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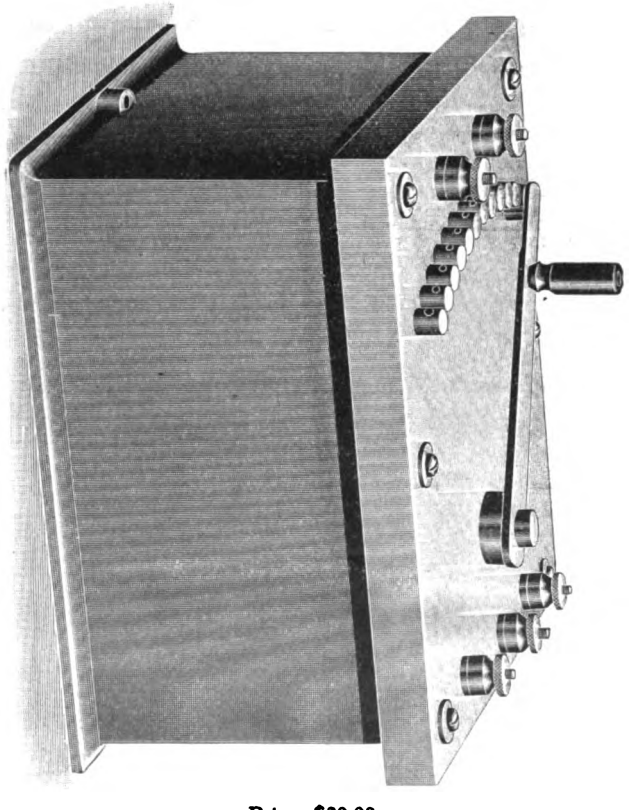
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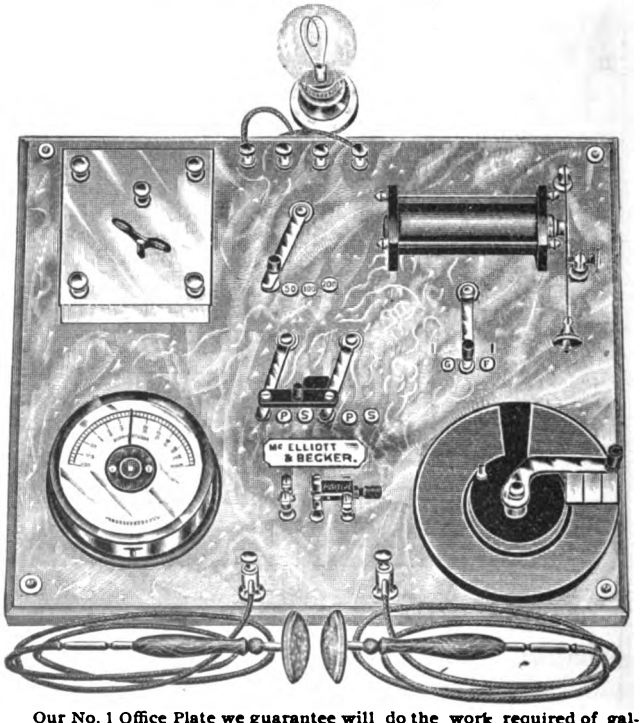
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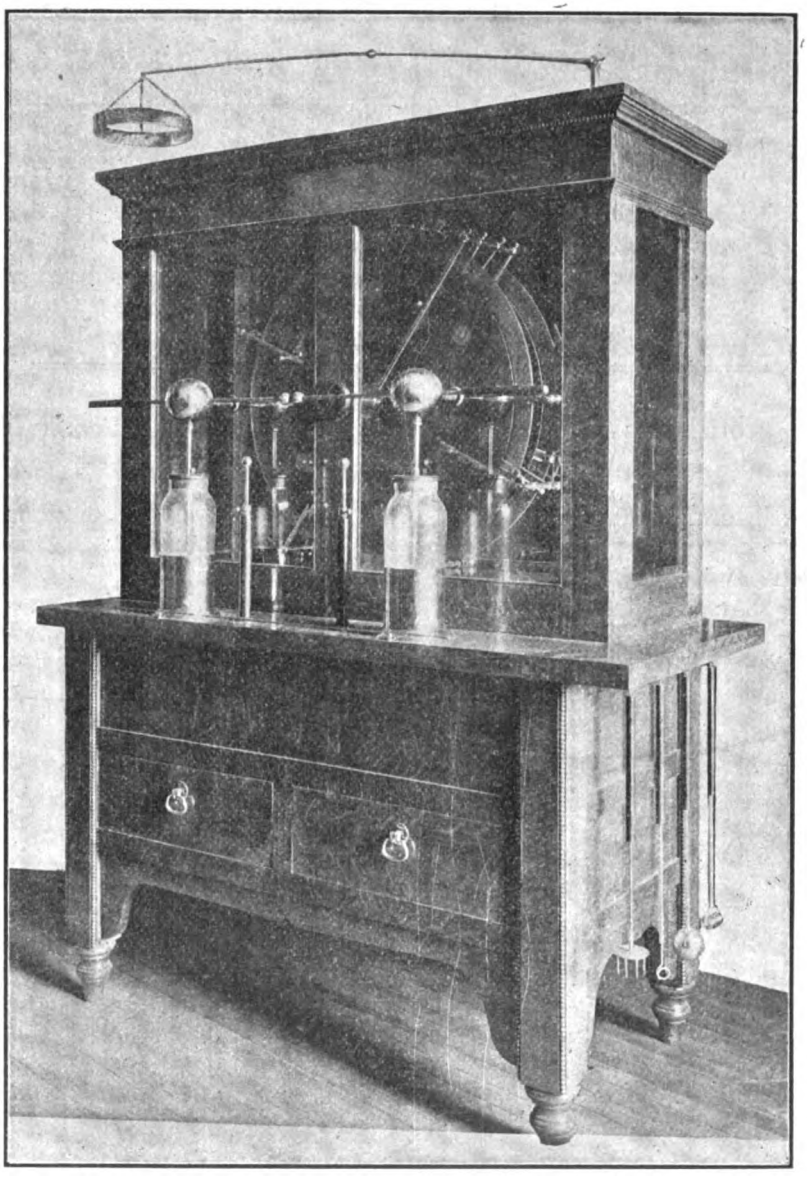
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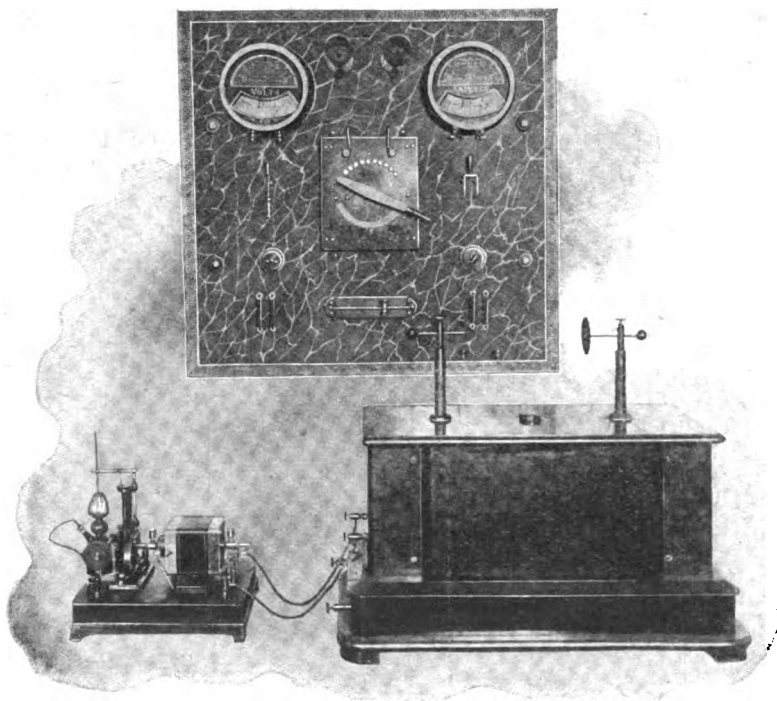
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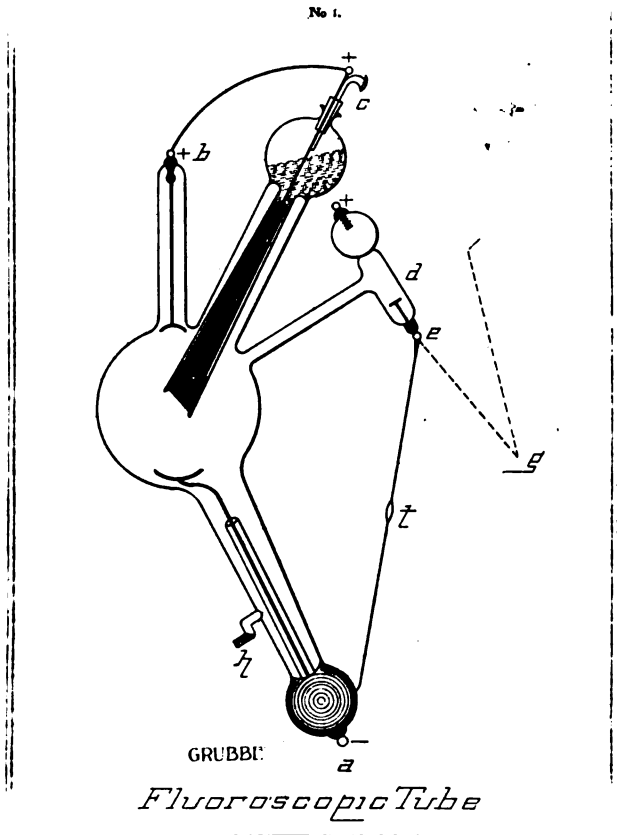
AMERICAN
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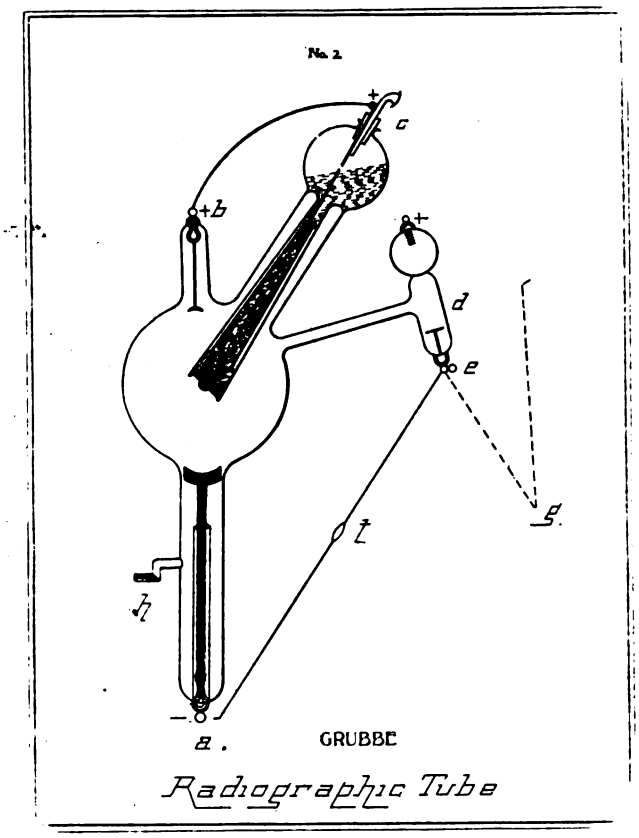
VOL. 1. CHICAGO, NOVEMBER, 1901. No. 6.

X-RAY TUBES.

Paper read before the Chicago Electro-Medical Society by Emil H. Grubbe, B. S. M. D., Professor of Electro-Physics, Radiography and X-Ray Diagnosis, Illinois School of Electro-Therapeutics; Lecturer on Electro-Therapeutics Hah. Medical College and Hospital; Chief Radiographer Illinois X-Ray and Electro-Therapeutic Laboratory; Member of Roentgen Society of the United States, also Electro-Medical Society of Chicago, etc.



Fluoroscopic Tube



Radiographic Tube

The constant investigations of the past year with the Roentgen phenomena have developed immense improvements in X-ray apparatus. But great as has been our progress as regards apparatus and methods, comparatively slow progress seems to have been made in developing that most important part of an X-ray outfit, the Crooke's vacuum tube.

I wish, in this paper, to give a short review of the principles applied in the construction of tubes and incidentally to throw out a few ideas pertaining to the methods involved and the kind of tube necessary in order that we may get good, powerful X-rays. By powerful X-rays I mean X-rays which have great penetrating power. This standard, I believe as far as we now know, is the only one which gives us any conception of the variability of X-rays.

From the great variety of tubes now upon the market we must conclude that many attempts have been made to improve the Crooke's tube. At present the so-called standard tubes are made upon a general plan which consists of a vacuum bulb of thin glass, having two tapering ends, from one of which enters a highly polished concave aluminum disk, called the cathode, and from the other projects, almost to the center of the tube, and usually from three to four inches from the aluminum disk, a thin sheet of platinum called the anode inclined at an angle. From this sheet of platinum X-rays are sent out of the tube.

In order that I may not be misunderstood later on I wish now to make a general statement including my opinion of X-ray excitation and partially its origin.

The X-ray is the result, primarily, of electrified particles of gaseous matter propelled or pushed by high voltage from the cathode disk of a vacuum tube,

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directly opposite—this manifestation has been called the cathode-ray. When cathode rays are stopped in their terrific speed through the bulb of a tube, by the interposition of a very dense body, as for instance platinum, a transformation occurs, resulting in a peculiar manifestation which we recognize as X-rays. The X-rays, then, are the result of the reflection or convergence of electrical discharges from the concave aluminum disk to the platinum sheet which is placed in a direct path. Now, when the currents discharged into a vacuum tube are heavy or long continued the platinum sheet becomes red or even white hot, indicating the transformation of these cathodic electric waves into heat waves. We know that in the ordinary X-ray tube the vacuum is never a constant, but always varies, and that this variability increases as we use the tube. The cathode rays depend for their generation upon a certain degree of vacuum, and if this vacuum is constantly varying, of course the cathode rays vary in quantity and quality and consequently the resulting X-rays vary accordingly.

It behooves us then in order that we may have a constant X-ray value, to provide tubes which will keep, as near as possible a stationary vacuum and which in addition will at all times be under perfect control of the operator. The all-desirable qualities which a tube should have depend largely upon the purpose or use to which we expect to make the tube. I believe it is impossible to construct a tube which will be ideal for all varieties of exciters and also for all varieties of uses, viz: Radiographic, Fluoroscopic and Radio-Therapeutic.

Today the best type of tube for Radiographic work is, no doubt, the so-called "focus tube." A focus tube has its internal electrodes so shaped and placed that the cathode rays emanating from the negative concave disk will be collected and concentrated upon the positive platinum sheet at a very small area or spot.

When a tube is of such vacuum that it just begins to permit the production of X-rays we say we have a low vacuum or soft tube. By the aid of a fluoroscope we can always determine relatively the vacuum of a tube. In general, we may say, that if the hand is placed before the fluoroscope five inches from the tube and the bone outlines are not clearly distinguishable we have a low vacuum tube. If now the vacuum is raised we shall have more and clearer bone outlines, and finally in using a high vacuum tube the X-rays pass through the bones so that they appear only faint in outline.

Under ordinary conditions of low or medium vacuum we can usually make out two separate and distinct hemispheres in the tube bulb, one dark, emitting no fluorescent light and one luminous emitting a greenish light, but when we excite a very high vacuum tube using a very high voltage current not only does the platinum disk and the luminous hemisphere give off X-rays, but, in fact, the whole tube gives off appreciable rays.

Before making a Radiograph a fluoroscopic view should always be made to determine the vacuum of the tube. I believe at present we know of no other method which may be used as a standard. Of course, even as simple as it may seem, it nevertheless is an exceedingly variable standard, and therefore a large amount of experience is necessary to apply it. The method is this: We must bring our vacuum to such a degree that we can generate X-rays powerful enough to penetrate the tissue which we wish to Radiograph. If we do not penetrate the tissue we certainly cannot determine its internal make-up. It is impossible to show the structure of a bone unless you can apply rays powerful enough to penetrate the bone. In this connection I might say that if this method is applied before the plate is exposed it will be found to materially shorten the time of exposure, and, above all, the proportion of under-exposed and under-developed negatives, in short, useless plates, will decrease as we become more and more familiar and adept in the use of the fluoroscopic method. I may also add that the tube must not be too high, as then we lose all detail of structure. Relatively the nearer a body is brought to the screen, and the farther away from the tube, the more normal the fluoroscopic outline. For instance, to get sharp bone outlines of the chest in fluoroscopic work the vacuum must not be too high and the fluoroscope must be in direct contact with the body—chest or back.

In order to get a normal shadow of the heart it is necessary to place the body a short distance away from the tube (ten to fifteen inches), as otherwise the shadow may be magnified and at the same time it will not show clear in outline. Here the tube vacuum should be just high enough to give a black outline of the heart; anything higher will blurr the shadow and make it irregular.

It is a well-known fact that a tube which may at one time be considered of low or medium vacuum will gradually become raised to a higher and higher vacuum as it is ordinarily used; this is sometimes detrimental. It is also a well-known fact that as the vacuum constantly becomes higher the voltage necessary to push the current through the tube at first becomes ultimately inadequate because of the inability of the apparatus to furnish the same.

The first drawback is overcome, if deemed necessary, as, for instance, in Radio-Therapeutic work, by the use of a tube which has a variable vacuum attachment. The second drawback, that of low voltage current, is overcome by the use of more powerful apparatus, which develops enormous voltage, and is therefore able to overcome the high resistance of the tube due to its high vacuum. In this connection it may be mentioned that it seems out of order to label a tube for

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a certain voltage, as, for instance—40 cm.—50 cm. spark length, when the vacuum, which determines the ability of the tube to stand certain voltage, goes up and down—in other words, varies constantly as the tube is used.

Scientific research of any kind can be of really little importance if it does not lead to practical application or better practical results. The endeavor to improve the X-ray tube has been general, but I believe some very important mechanical and electrical facts have been omitted in the construction of this instrument. First, I find the greatest difficulty in getting a tube which has its external electrodes far enough apart to prevent sparking or short circuiting on the outside.

We know the greatest desideratum in X-ray work is maximum radiance. Up to the present time we have not been able to secure radiance approaching the maximum, because of the inefficiency of the Crooke's tubes. Personally I find, in order that we may use high voltage currents (an absolute necessity to the derivation of maximum or penetrating radiance) that the internal parts of the tube, including the vacuum, are not so much at fault as the external parts. We must separate the external electrodes much farther than we have been doing.

The more we study the X-ray the more we find it necessary to have special apparatus to meet certain conditions. For instance, it has been found desirable for Radio-Therapeutic work to operate a coil, which, by the use of from 3-5 amperes of current in the primary, generates a low voltage and high amperage current from the secondary—a short, but thick, spark. On the other hand, to make Radiographs we need a current of high voltage as well as high amperage. In making this statement I am aware that I am discussing only one-half of the question, as the tube vacuum at which it is worked is, of course, a very important consideration also.

Greatest difficulty is experienced in getting tubes which can dissipate more than a certain limited amount of energy in a certain period of time without danger of breaking or burning out. First, then, in order to get a tube high in vacuum it is necessary to place the external electrodes far enough apart so that high voltage currents can be utilized without danger of breaking the tube or of the spark passing or jumping around the outside of the bulb. Next, we need tubes so constructed that the anode will readily radiate the heat which is developed whenever large volume currents are used.

Since the ideal has not yet been reached as regards the above two factors, I believe it is in order to mention a few ideas and give a few designs on this subject. In the following considerations I need not mention specifically the kind of exciting apparatus to which these tubes are especially suited, suffice it to say that the tubes for use on the Static Machine need not be made with as much metal or heat absorbing materials as is necessary when a coil is the exciting agent.

We will now consider tubes from the fluoroscopic standpoint, ignoring as far as possible the use of the tube from the Radiographic or Radio-Therapeutic standpoint. Good fluoroscopic views of bones especially are only obtainable from the very highest vacuum tubes, and, indeed, in general it may be said that for fluoroscopic work a much higher vacuum relatively is needed than for Radiography. Steadiness of the illumination or fluorescence is a most desirable function in connection with penetration. The former is brought about by using rapid interruptions, if an induction coil is used (1600-2500 per minute), the latter is developed by the use of a high vacuum and also very high voltage and is independent of the quantity of current. Because of these conditions we are able to get better fluoroscopic views from a large rapidly speeding Static Machine than we can possibly obtain from a coil. Fluorescence is steady and voltage is very high.

Since glass is an obstructor to X-rays it is necessary that the bulb through which the rays pass be exceedingly thin, and not only thin, but uniformly thin. In the average tube sold today the bulb part of the tube is so thick that I doubt if we get more than 50 per cent of the actual X-ray value for use on the outside. Another valuable factor to be observed in choosing a good tube for fluoroscopic work is that of the large-sized bulb. A large bulb will stand both higher voltage and amperage for a given vacuum. Also the larger volume of gaseous space tends to keep such a tube more stable as regards its vacuum, and therefore it may be used for a much longer period of time (time being sometimes a very necessary consideration in matters pertaining to diagnosis) without any appreciable change in the vacuum. Finally we can say that the larger the bulb the longer the life of the tube.

From our study of the cathode rays in their relation to X-rays we must come to the conclusion that, generally speaking, the more cathode rays we have in a tube the more X-rays are generated.

I wish to refer to diagram No. 1, which illustrates a special tube and which I shall call the "Fluoroscopic tube," because it is designed specially to show to the best advantage all the factors prominent in an ideal fluoroscopic tube as far as I am able to judge. I recommend a very large bulb, 10 to 14 inches in diameter (if it is possible for high vacuum bulbs of that size composed of glass 1-64 inch in thickness to stand up against atmospheric pressure), because of reasons previously mentioned. The large size of the bulb allows of placing larger electrodes in the tube and therefore we naturally get more X-rays than is possible from a smaller tube having small electrodes.

In an excited Crooke's tube the whole luminous hemisphere gives off X-rays. For fluoroscopic use a

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tube should not focus the cathode rays at a point upon the platinum sheet and the anode is best placed so that it strikes the cathode rays before they come to a focus. In this manner the anode becomes uniformly red hot and we get a large quantity of illumination upon the screen, i. e., X-rays spread over a large area. This is especially appreciated when we wish to use a large screen in examining the chest or abdominal cavities. This spreading of the cathode stream may be brought about by placing the anode at an angle of 45 degrees to the path of the cathode rays and within the focal point of these rays. Now, by moving the cathode end of the tube away from the active hemisphere, and placing the aluminium disk within the bulb, we present a glass surface of even thickness, and since the aluminium disk is insignificant as an absorber of X-rays it, of course, need hardly be considered from the standpoint of resistance. In the usual tube the cathode disk is placed so near the glass that in conjunction with the great heat generated upon its surface a deposit of metallic aluminium soon occurs upon the glass surface in the neighborhood of the cathode disk. Placing the cathode disk within the bulb also does away with the stray X-rays resulting when the cathode stream strikes the sides of the tube immediately surrounding the disk, usually recognized by the formation of a light green ring on the glass surface just above the aluminium disk.

The presence of the metallic ball, preferably made of aluminium, at the cathode electrode on the outside of the tube, is for the purpose of further intensifying the volume of current. In this position its action is that of a condenser. The value of this attachment becomes obvious, because in using very high vacuum tubes we have learned that heaping up current at the cathode gives us more efficient X-rays (internal resistance being thereby lessened), ultimately this is also a means to steady the fluoroscence. This condenser is made globular and is to be kept highly polished, in order that current radiation may be insignificant. Condensers of other shape have been found to be impractical because of the extensive radiation usually present during high resistance.

Further consideration of this tube must be left to an examination of the diagram, which I believe is self-explanatory.

Next, let us consider a tube especially designed for Radiographic work. I refer you to diagram No. 2.

This tube, as is indicated, is especially constructed for Radiographic work—that is, it is able to stand up against both high voltage and high amperage currents.

To be able to use currents of large volume as derived when the various types of electrolythic or mercury interrupters are in circuit, it has been found best to cool the heated platinum disk by having a continuous flow of water near the anode to absorb the heat generated. By this method we may pass powerful currents through the tube for a few minutes without noticing any material deterioration of the vacuum. According to the diagram we do away with the continuous water stream and substitute a very large steel jacket, extending almost the full length of the anodal electrode in the bulb of the tube, and in addition to this we fill this metal jacket with a large quantity of heat absorbing oil (even water may be used). This does away with water bags or bottles and rubber tubing for conveying the water to the tube, a very inconvenient arrangement.

Since it is a well-known fact that if we wish to attain the best definition on a plate exposed to the X-rays we must bring the cathode stream to a very fine focus at the anode, and the smaller the focal area the better the definition. The platinum abode in this tube has a small, but very heavy, projection, upon which the cathode rays are brought to a focus. This tends to confine the heating to a small area and also sends away X-rays sooner than any other part of the disk. In order to still farther favor the focusing of the cathode rays the anode should be placed at an angle of from 60-65 degrees to the cathode stream. This arrangement gives sharp or clean and contrasty picture and the exposure can be made very short. We get not only a shadow picture of the gross outlines of parts exposed, especially bones, but also an idea of the inner structure. This we call definition, and it depends primarily upon our ability to place the cathode rays at a small area upon the platinum disk.

The bulb of a Radiographic tube need not be as large as for a tube used in Fluoroscopic work, indeed in order to prevent blurring of the picture we wish to avoid all radiation except that originating at the focal point upon the anode. A small tube gives off few stray rays, there is very little spreading, and consequently such a tube is desirable for producing pelvic and chest pictures. It is well established that the more we increase the amperage of the current applied to a Crooke's tube, provided the voltage is high enough to overcome the resistance, the more X-rays we get. No doubt the degree of fluorescence determines largely the photographic power of the tube, but if it is possible to measure the quantity of current passing through the tube at any period of time we are always in position to know accurately the Radiographic effect of a tube. It may be stated that the higher our amperage for a given vacuum the more rapid our ability to make Radiographs. It is the large quantity current which causes chemical changes upon the photographic plate.

A properly constructed X-ray tube to give clear definition and prevent diffusion to any great extent must have its cathode disk so placed and shaped (very concave) that cathode rays coming from this disk do not strike anything before reaching the anode. This cathode disk, in order that it may stand the large

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quantity of heat developed upon its surface should also be large in ear, as shown in the diagram, so that heat radiation may be good. Finally in order that we may use high voltage currents and thereby get penetrating X-rays, all the electrode containing parts of the tube are placed far apart; about twice the distance which is observed in the common tube.

In conclusion let me say that no apologies are offered for anything presented in this paper, because I believe it is only through digestion of speculative ideas that we can hope to proceed in our investigations of so wonderful and powerful a force as the X-ray has proven itself to be.

819 Champlain Bldg., Chicago, Illinois.

THE TREATMENT OF CHRONIC BRIGHT'S DISEASE BY STATIC ELECTRICITY.

By Dr. C. S. Neiswanger.

Unfortunately the doctor did not write a paper, but only spoke from his notes before the Chicago Electro-Medical Society. He said in part:

Bright's disease is one of distinctly central nervous origin, and to be successfully handled must be treated as such. The path along which impressions are conveyed to the kidney is through the splanchnics and the spinal cord. When this track becomes impaired it causes degeneration of the kidney, such as is evidenced in albuminuria.

He records his observations made in fourteen cases of this trouble, in all of which the diagnosis was made by experts in urinalysis and the microscope; these fourteen cases were all cured, but he regrets that he refused to treat four or five cases because he thought the prognosis was bad, and now thinks that if these latter cases had been taken the percentage of cures would not have been so high. The notes of a number of individual cases were quite interesting and showed a thoroughness of detail that is surprising. His first idea that the pathology of Bright's disease must be changed to one of central nervous lesion was the character of the people who have this trouble—viz., ministers, doctors, lawyers, board of trade operators and all such persons as those who are under mental strain and excitement. Very seldom are common laborers affected with this trouble. Grief alone has been known to bring on Bright's disease. The people who have this trouble are those who press the button that rings up the great sympathetic until the battery which runs it, is exhausted. The disease must be of nervous origin, because the means used to effect a cure are only operated through central nervous channels. The treatment was by static electricity alone as follows: Negative head breeze for fifteen minutes, followed by positive insulation, fifteen minutes. No medicine was given in any case.

For some time it has been acknowledged that diabetes was a disease of nervous origin and some persons even have the temerity to state that jaundice is a disease of like origin, but these practitioners seem to stick to the old pathology of Bright's disease in view of all the facts that lead us to believe to the contrary.

ROENTGEN RAY IN THE SPANISH-AMERICAN WAR

Government Printing Office, Washington.

This is a finely printed and bound volume, issued by the government of about 100 pages of printed matter and some ninety-five half-tones, illustrating different wounds and fractures, with full account of the several cases reported. We copy briefly what is said of

Radiography.

Photography is an indispensable adjunct to Roentgen ray work, as it is necessary to supplement nearly all fluoroscopic examinations by this agent. This arises from the fact that the visual sense is not sufficiently acute, nor is the outline shown on the fluorescent screen sufficiently distinct to enable an observer to determine the finer details of most objects through which the X-rays will work. Frequently in working through the thicker parts of the body the fluorescence is not sufficient to enable the eye to accurately determine the outlines of an object or to differentiate it from surrounding objects. In such cases accurate images can only be obtained by the prolonged action of the X-rays upon a photographic plate. By the prolonged action of the rays the sensitized surface of the plate stores up the impressions which are received upon it, so allowing the photographic production of images which could not be discerned visually. Also by means of photography a record of the condition which exists in the part examined is made possible, and these may be multiplied indefinitely from a single exposure by means of prints from the negative. For these reasons X-ray outfits should always be supplemented by sufficient photographic material to enable the operator to resort to photography whenever necessary.

While the technique of the production of photographs by means of the X-ray does not differ materially from that used in ordinary photography, still there are points of knowledge which will further the operator's endeavor to obtain good results. Of special importance are the plates used, the length of the exposure and the method of development.

Photographic Plates.

All photographic plates are not equally applicable to radiographic use. Plates for this work should be thickly coated with an emulsion of the highest degree of sensitiveness. Extreme sensitiveness is requisite for the reason that, compared with ordinary light, the X-rays have but feeble action upon the silver compounds with which photographic plates are coated.

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Consequently, unless the plates are "rapid"—i. e., very sensitive—exposure will have to be unduly prolonged in order to produce satisfactory results.

The necessity for a thick coating to the plates arises from the desirability of shortening exposure to the briefest possible time.

The X-rays do not work upon the surface of the sensitized emulsion alone, but penetrate it and act equally, or nearly so, throughout its entire thickness. This may be proven by superimposing several sensitized celluloid or paper films and then taking a radiograph upon them.

When developed the image upon the lowest film will show no appreciable difference from that upon the upper. If now the developed films are superimposed and viewed by transmitted light, the parts acted upon by the light will appear much more opaque than when each film is viewed separately. From this it follows that a plate coated with a thick emulsion, when exposed and developed, will, by reason of the reduction of the silver salts throughout its entire thickness, give more contrast and printing density than one with a thin coating.

In testing plates the following method is useful: Place four plates in "light-tight" envelopes and put them side by side in the form of a square under the Crookes' tube. Place on each plate a circular disc of tin and in the center of the disc a coin. Fix the anode of the tube directly above the center of the square formed by the plates, so that all the plates will be equally illuminated. Turn on the current so that the tube will be illuminated and the plates exposed. Expose for about three minutes, and then develop all the plates together in the same tray, with the same developer. Comparison of the finished negatives will show which plate is the most rapid by the greater density of the shadow where the rays have worked through the disc, and the contrast can be judged by the relative density of the shadow and the part of the negative outside of it.

Exposure.

The length of exposure depends upon the amount of radiation from the tube, the distance of the tube from the plate, the rapidity of the plate and the density of the part through which the rays have to work. In general way we give: Forearm and hand, one to two minutes; shoulder and chest, ten minutes; knee, nine minutes; hip joint, head and pelvis, twenty minutes.

Unless radiographs can be taken of the different parts named in the time given, the tube is not working properly, either from some defect in the tube or the current by which it is excited, and the attention of the operator should be directed to these defects and he should correct them, rather than attempt to obtain a result by prolonging the exposure.

THE TREATMENT OF HYPERTRICHOSIS BY X-RAYS.

By Joszef Jutassy.

The object is to induce repeated slight attacks of inflammation, so as to secure at last permanent degeneration of the hair papillæ. The effect produced depends upon a variety of circumstances, such as the quantity of light (which cannot be measured), the individuality of the patient and the working of the coil and tube. If the exposure is continued only sufficiently long to cause hyperaemia, the alopecia will be transient. Inflammation must follow, but this may vary, according to its intensity, from a simple erythema to a purulent dermatitis, leaving a scar.

The reaction is quicker and more thorough in young than in middle-aged patients, and in blondes than in brunettes. Strong hairs are lost quicker, relatively speaking, than mere down. The reaction is greatest in the center, where the rays are vertical. Exposure must never be prolonged more than half an hour, and the tube must never be nearer than 25 centimeters. It is said that tubes of lead oxide glass, giving a blue light, do not cause any reaction.

The effect is due to the Cathode rays. It is not the result merely of electric currents of high tension, for *Richer* and *Londe* mention the case of two men who suffered from the characteristic form of X-ray dermatitis of the hands, with brittle, irritated nails, etc., after one month's work at Salpetriere, although they had been working a twelvemonth before with high tension currents with perfect immunity. Jutassy's own hands recovered completely, in spite of the fact that they were constantly exposed in the electric field. The fact that reaction occurs more quickly when the patient is isolated is no proof that it is due to electric currents. Certainly the dermatitis is not due to the producion of ozone, for then all alike would suffer.—Fortschritte auf dem Gebrite der Rontgenstrahlen.

TRANSPERITONEAL URETEROLITHOTOMY.

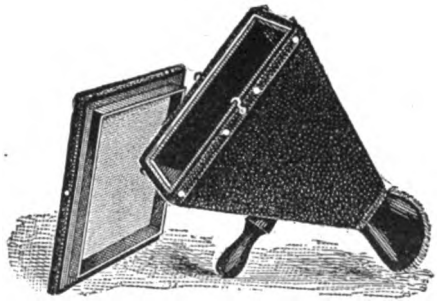
Geo. N. J. Sommer, M. D., Trenton, N. J.

The patient was a woman twenty-three years of age, weighing only 86 pounds. She had suffered from repeated attacks of right renal colic. A radiograph of both kidneys, ureters and bladder was taken by Dr. Chas. L. Leonard of University Hospital, Philadelphia. The technique consisted essentially in the employment of a self-regulating tube set to run at 1½ inches vacuum. The tube was 14 inches above the plate over the last lumbar vertebra. The exposure was ten minutes. A calculus was found on a level with the brim of the pelvis, and was removed subsequently by transperitoneal operation. It was found one centimeter below the iliac vessels.—Annals of Surgery.

NOTICE.

The next regular meeting of the Chicago Electro-Medical Society will be held Tuesday, Nov. 26, at 8 p. m., at 1101 Masonic Temple.

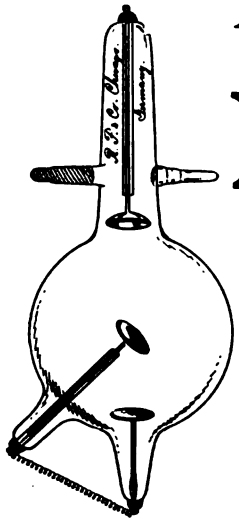
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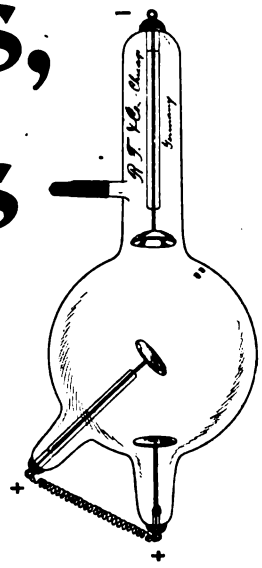


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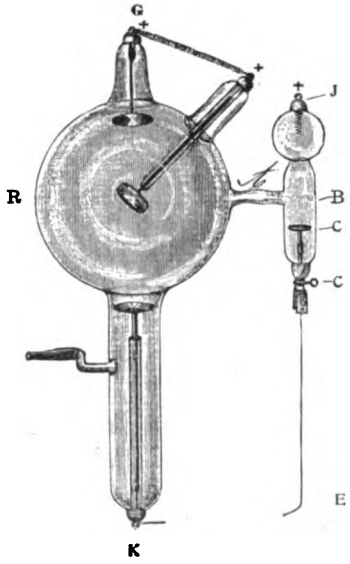




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The fact that electricity used in the form of currents of high frequency is the most powerful agency in the modification of the intimate nutrition of the tissues known gives force to the assumption that we unhesitatingly make, that the physician of today must become skilled in the most approved methods of its application, as well as that he is skilled in the properties of the drugs that he administers. It is a modifier which has to do with life in its most intimate manifestations, which affects the working of the living cell, its action extending even to the products of the cell; and as these currents can traverse with impunity the organism of the living subject, there is no arrogance in the assertion that by the means of these electrical currents, in their various modifications of static, galvanic, faradic and still later of the X-ray, an almost new world of therapeutics is opened up, where nature's universal laboratory may be drawn upon, as occasion may require. In fact, we feel that hardly can we say too much, in our urging the profession to no longer leave this powerful agent for good in the hands of the quack or the well-intentioned but ignorant person who may chance to have "a battery," and found it was "good for something," and whose skill (?) is confined to "reversing the current" if his first trial does not seem to produce the desired result.

SECRETARY'S REPORT.

Meeting of the Chicago Electro-Medical Society held Tuesday evening, Oct. 29, 1901, at room 1101, Masonic Temple, State and Randolph streets, Chicago, Ill.

Meeting called to order at 8:20 p. m. by Dr. G. G. Burdick, treasurer of the society. Minutes of previous meeting read by secretary and approved. At the request of the society Dr. Burdick presented a patient whom he is treating by X-ray for Osteo-Sarcoma, illustrating the case by radiographs. On request for report of committees, Dr. Baer reported that he had been unsuccessful in securing a permanent home for the society. Dr. Neiswanger offered the rooms of the Illinois School of Electro-Therapeutics for future meetings of the society. Meeting then proceeded to the reading of papers of the evening. The first paper, entitled "Treatment of Chronic Bright's Disease by Means of Static Electricity," was delivered in the form of an extemporary address by Dr. C. S. Neiswanger and discussed by Drs. Grubbe and Pratt. Dr. W. A. Pusey was called upon, but declined to speak.

The next paper, entitled "X-Ray Tubes," was read by Dr. E. H. Grubbe and discussed by Prof. Treadwell and Dr. Pratt.

On motion it was decided to devote the next meeting entirely to the election of officers and adoption of rules and by-laws.

Prof. Hall requested that he might report upon some experiments he had made in radiography; request granted by the chair. Discussion of paper was postponed until some future meeting. On motion meeting adjourned at 10:30 o'clock p. m..

RICHARD H. STREET, M. D., Secretary.

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue?

The October number of the American Medical Monthly of Baltimore is received. We notice it has (and gives credit) the article by Dr. Blackmarr on "Lupus and Its Positive Cure," published in our August number. All right, Brother Chandler, we each are trying for the same thing—to aid and assist our readers of the profession in their work against disease. Our motto is "Let there be light."

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THE EFFECT OF ROENTGEN RAYS IN A CASE OF CHRONIC CARCINOMA OF THE BREAST.

Andrew Clark, F. R. C. S., gives the history of a patient, sixty years of age, who was admitted to the cancer wards of the Middlesex hospital in September, 1898, suffering from advanced carcinoma of the breast. It had been first noticed in 1890. No operation had been performed. Treatment of the X-rays was begun on March 6, 1901, and continued five days a week up to the present time, the surface being exposed to the rays for fifteen minutes at a time. In ten days it was noted that the sore was cleaner and that numerous islets of epithelium were present. On April 14 the appearance was still improving, and the pain was much less severe. May 14 the induration had been gradually getting less; the glands are smaller; there is but little pain and the general condition is improving. Two illustrations are given—one from a picture taken before the treatment, the other at date. No details are given with regard to apparatus. The patient was being treated for other disorders at the same time. Physicians reporting cases, ought we think, to give details; but still it is interesting to know that treatment by X-rays show good results.—British Medical Journal, June 8, 1901.

X-RAYS IN DIAGNOSIS OF FRACTURE.

Wegner publishes the particulars of three cases in which five partial fractures of the patella were shown by radiography. The fibrous tissue passing over the front of the bone was not torn, so that the power of extension of the knee joint was not lost. In two of the cases the patient could go upstairs. The third case was not seen until four months after the injury had been sustained. Wasting of the quadriceps was most conspicuous. This fracture had been caused by muscular action. The diagnosis, which is only possible by means of the X-rays, is of some importance, as such a fracture might very easily, by a little want of care, be converted into a complete one, with tearing of the fascia and the capsule of the joint on either side, and a wide separation of the fragments. In view of these cases, we are impelled to say to our surgeons that an X-ray outfit seems to have become almost a necessity in the present progress of the profession—Deutsche Zeitschrift fur Chirurgie.

VALUE OF THE X-RAY IN CASES OF FRACTURE.

The revolution which has taken place in the treatment of certain fractures since the introduction of the X-ray is alluded to by Dr. Carl Beck of New York. He gives a most remarkable series of photo-engravings illustrating various injuries to the carpus and lower end of radius and ulna, clearly demonstrating that while the general type of Colle's fracture is usually present, it is not uniformly so, and that fractures of the lower end of the radius differ more in character than any other fracture. He finds that the line of fracture is more clearly seen if the X-ray exposure is made a few days after the injury when the callus formation has already begun. In treating these injuries he uses a long adaptable wire splint applied to the flexor side of the arm from the tip of the fingers to the elbow and a short narrow wood splint on the dorsal aspect of the arm. An adhesive plaster pad is applied to make pressure at various points depending upon the position of the fragments. After a week's time the union of the fragments has progressed far enough that the safety of soft parts should be considered and short splints applied. At the end of the second week a plaster bracelet is all that is needed, and from the third week on massage treatment with passive motion of the joint is indicated. He lays emphasis on the importance of reduction of the displacement, for if the fragments are left in their abnormal position they produce pressure which gives rise to bad results. Among the other injuries accompanying fracture of the lower end of the radius Beck finds transverse fracture of the scaphoid bone quite common. He has observed this injury in nine cases and believes that this injury explains the enormous intra-articular effusion which is sometimes present, and which is responsible for the great tendency to the formation of adhesions and stiff joints in these cases. —Annals of Surgery, August Number.

PROPERTIES OF THE ROENTGEN RAYS.

Some interesting properties of the X-rays were recently described by Prof. Roentgen in a communication to the Berlin Academy of Sciences, and are summarized in the *Electrical World* as follows: If a fluorescent screen is protected from the direct action of rays emitted by a tube, by means of an opaque plate, a slight fluorescence is nevertheless seen when the tube is in action. Roentgen has now shown that this is due to the fact that *the air around the tube* gives forth X-rays. The brightness of a screen illuminated with rapidly intermittent rays depends on a number of properties which he enumerates. The X-rays from a platinum focus plate which are most active for showing images are those which leave the plate at the greatest angle, but not much greater than 80 degrees; thick plates have a relatively larger transparency than thin ones; that is, the specific transparency of a body is greater the thicker the body; the same body has different transparencies with different tubes—"soft tubes" being those requiring a small potential and "hard tubes" those requiring a high one.

The quality of the rays from the same tube depends on: The way in which the interrupter works; the insertion of a Tesla transformer; the vacuum; and other processes in the tube which are not yet fully investigated. The smallest pressure at which X-rays are produced is very likely below 0.0002 m. m. of

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mercury. The composition of the rays from a platinum anode depends largely on the element in the current; the quality of the rays does not change with changes of the primary current, or at least very little, but the intensity is proportional to the strength of the primary current between certain limits.

The following conclusions are stated: The radiation consists of a mixture of rays of different intensity and absorbability; the composition depends greatly on the time element in the current; the rays produced by the absorption of bodies are different for different bodies; as X-rays are produced by Kathode rays, and as both have common properties, it is probable that both processes are of the same nature.

If two screens are illuminated with two tubes of different hardness, the illumination being made equal, and if then replaced by photographic plates, the one illuminated by the harder tube will be blackened much less than the other; rays which produce equal fluorescence can be photographically quite different; the usual photographic plates are very transparent for X-rays (in a pile of ninety-six (96) filaments exposed for five minutes the last one showed photographic action); the eye is not entirely passive to X-rays.

We could wish for a fuller report, but this will give our students and experimenters at least a few hints as to what is already worked out by the discoverer of the X-rays himself, and at the same time be an inspiration for further discovery.

Prof. J. J. Thomson suggests that the X-rays consist of very thin and intense electro-magnetic pulses produced in the ether by the sudden stoppage by the anti-Kathode of the electrified particles of the Kathode stream.

PRINCIPLES OF ELECTROTHERAPY.

George W. Jacoby, M. D., says that any examination regarding the therapeutic value of electricity must start with the fundamental questions: First, whether electricity in fact exerts a beneficial influence upon the course of disease; and second, if so, in what way is this effected?

That electricity does exert some such beneficial influence must be admitted by every unpartisan observer, for if from all cases in which improvement has set in after the beginning of electric treatment we deduct every case in which the improvement may be ascribed to the natural course of the disease, there still remains a large number of cases in which the improvement can be accounted for only by assuming a casual connection between this and the treatment. *How electricity acts* in the cure of disease is, however, a question that cannot be answered in a dogmatic manner. Such action, in whatsoever manner it may take place, can be only a direct or an indirect one, and it is well to say at once that any direct curative influence upon the structural alterations caused by disease has not been proven, and is not probable. We must go even further and admit that electric applications can have no specific action, inasmuch as electricity is a form of molecular motion and can therefore possess no inherent influence not possessed by some other form of dynamic treatment. Let us not be misunderstood, however; the negative of a direct specific action of any remedy is by no means equivalent to a denial of any action of such remedy. Many remedies act as stimulants, as alteratives, or as derivatives, yet how meager would be our results in the treatment of internal diseases without such actions, which surely are something quite distinct from a direct specific effect.

Nor is the denial of a direct specific action equivalent to saying that electricity acts only by suggestion, for the indirect action is a very evident and extensive one, partaking of qualities possessed by many other remedies.

Indirectly, the function of an organ can be influenced only in one of two ways—either by stimulating, or by retarding it. Clearly it is impossible to add any quality to those that an organ possesses physiologically; all that we can do is to modify the properties that it already has. Neither morbific nor therapeutic agents endow the organism with new attributes or introduce into its operations new powers. The one or the other can only act as modifying that which is habitual, or by evolving that which is latent.

This modifying influence, whether it is one of stimulation or one of inhibition of function, may be produced by electricity: First, through its exciting action —an action that is evidenced by the pain produced when electricity is applied to cutaneous sensory nerves, by contraction of muscles when motor nerves are acted upon, by vascular dilation and by increased secretion when vaso-motor and secretory nerves are stimulated, and that is undoubtedly of prime importance in therapeusis of whatsoever nature.

Second—Through its electro-tonic action—for it is evident as a result of our physiologic studies that every current must set up, in a nerve upon which it acts, a state of electrotonus, and that this condition represents an alteration in the excitability of such nerves.

Third—Through its chemical action and electrolytic effects.

Fourth—Through its cataphoric action.

Fifth—Through its psychic or suggestive action.

It is hardly probable that any one of these influences is ever dissociated from the entire group, and it seems reasonable to assume that they all act together. That in certain forms of current one action may preponderate over the others, or one or other may be almost suppressed, is certain, but how great an effect is ascribed to each individual action has not been and cannot be demonstrated.

So when the suggestionist says that four-fifths of

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the therapeutic effect of electricity is due to its psychic action, the burden of proof falls upon him, and he has placed himself in an impossible position.

That, however, psychic influence does form a very large part of the therapeutically beneficial action of electricity is undoubted, because the channels through which it may so act are manifold. Psychic influence may be exercised directly and indirectly, and what is often forgotten, intentionally and unintentionally.

Direct suggestion is conveyed through the medium of hope or fear, no matter how produced. *Indirect suggestion* is dependent in great part upon the physiologic fact that voluntary movement is regulated by sensory impressions—a fact constitution an important element in all co-ordination and production of intended movements. If, as is not infrequently the case, a hemiplegic patient is able, after the application of electricity or some other peripheral irritant to the paralyzed part, to execute a certain movement that was previously impossible, this is due to the fact that by means of the sensory impression his will and his intention have been specifically directed to the paralyzed part, and in consequence of such augumented intention he has succeeded in sending a motor impulse.

Every motor impulse is due to stimulation, either of sensory or of a perceptional nature, and in electricity we possess an agent peculiarly adapted to the production of both sensory and perceptional impressions; for by its use not only are we able to produce cutaneous sensory perception, muscular perception and perception of altered posture, but in consequence of these perceptions and of the movements caused by the stimulation the concept is aroused in the patient that he is able of himself to bring about such a movement, and he thus innervates more forcibly than heretofore.

In this manner partial or complete recovery of motion may actually be regained, providing always that the corresponding motor tracts are not materially diseased or destroyed.

By such indirect suggestive paths does electricity act beneficially in hysteria; and all the remarkable improvements of disordered motility that follow a single electric application, and that are not of infrequent occurrence, are thus psychically superinduced.

Not only can motor impulses be suggestively aroused by means of sensory stimulation, but actual influence upon physiologic functions in a part, as alteration of circulatory and nutritional processes, can be produced similarly. Through such channels electricity may act upon altered tissues and upon the processes of disease.

How it actually does act is the question that *Moebius* has propounded and that as yet has not been answered satisfactorily. While Moebius has strongly fortified himself in his negativistic position by placing the onus of proof upon the advocates of a physical effect of electricity upon disease, he is nevertheless perfectly fair. Briefly stated, he claims that the doctrines of electrotherapy require proof; that in the majority of cases the effect apparently "propter hoc" is actually "post hoc" merely; that in the minority of cases, those in which there is an actual causal relationship between the use of electricity and the cure of disease, the same results can be and have been accomplished by means of suggestion; and that the proof that in electric cures we are not dealing with results due either to the natural course of the disease or to suggestion has not been furnished.

On the other hand, he says it has not proved that "there may be no road between the scylla of 'post hoc' and the charybdis of suggestion, and the possibility of a physically curative action of electricity cannot be denied."

Were it, however, absolutely certain—as it is not—that electricity cures only by psychic action and has no physical influence whatsoever upon disease, should we be warranted in giving up its use? Certainly not.

In conclusion, we say that not only should every practitioner of electrotherapy have a good working knowledge of therapeutic principles and methods in general, but also should every medical practitioner be as thoroughly conversant with electrotherapy as he is with other modes of treatment; and thus this part of general therapeutics would no longer, as heretofore, be allowed to remain entirely in the hands of specialists.

Furthermore, it is to be anticipated that the more general diffusion among physicians of accurate knowledge concerning electricity in its physical and physiologic relations, as well as of its powers and limitations as a therapeutic agent, while leading to its more extended legitimate use, will likewise tend to diminish the quackery that now abuses the credulity of many sufferers.—Electrotherapy, Vol 2.

Dr. W. F. Lee says, in relation to the philosophy of electro-therapeutics: Scientists tell us that the electrical energy is a part (condition) of every atom of matter, whether in the free or combined state, organic or otherwise, but, before proceeding with what may be of more interest to the reader, practically, it may be well to say a word about batteries. What are known as electric batteries are simply mechanical contrivances and machines (not infernal) invented and gotten up (by man) for the purpose of disturbing, making manifest and setting in motion the electrical energy. This is the design and the function of all batteries from great dynamo machines for lighting purposes, down to a single cell no larger than a lady's thimble. Now, to be brief, the key note to the modus operandi of all these electric contrivances—batteries—may be given in a word—potentiality. In other words, a difference of potential in different parts of the apparatus, battery or machine, as the case may be.

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This so-called unequaled potentiality between different essential parts of the battery is the direct and immediate result (in the simplest variety) of chemical action (e. g.), the destructive action of acids on metals, etc. When this chemical action begins in a battery cell, electrical energy is generated or set free, as a result, and there is an unequal or disturbed potential of the cell elements.

One side of the cell or battery is of high potential, or charged positive, while the other side is low potential and negative. We then have the necessary condition or disturbance for motion, or the establishment of a current of electricity which will readily show itself if provided with a conductor (wire) leading from one element of the cell back to the other, completing a circuit. The movement of the current of electricity is always from the higher to the lower potential or level and is driven around through the continuous conductor until rest is again established (by an equalized potential of the parts) or until the internal disturbing chemical action has become exhausted—worn out.

Now it has been said that "man is fearfully and wonderfully made." So he is, and at once becomes the most interesting specimen of mechanism with which we have to deal. In relation then with what has been given on artificial batteries we wish to suggest—affirm—that man (each one of his kind) should be looked upon, objectively as an organic battery of the most profound and delicate mechanism, or to state differently the human organism is a complete laboratory in itself, manufacturing its own energy—vital force, from the organs and parts whose functions this force in turn excites and governs. The different organs—nerve centers, etc., in delicate relation with each other, through their systems and circuits of nerves, would represent the essential parts of the organic battery. The food and water we consume, the oxygen we breathe, etc., constitute the material which represents the fuel and other products from which the chemicals necessary for the generation and evolvement of the vital electric currents.

The principles involved in the operation of artificial exciters of electricity (batteries) are not at all unlike those which govern the organic apparatus. Now if it were not for the principle of potentiality as previously mentioned (other requirements being perfect) there could be no movement of electric energy through the systems of arcs and circuits and therefore life (physical) would necessarily suddenly cease.

The more nearly, then, that we apply methods of nature's processes in practical therapeutic work, the better must be the results. It is this principle that is the very basis of what we call electro-therapeutics.—The Electro-Therapeutist.

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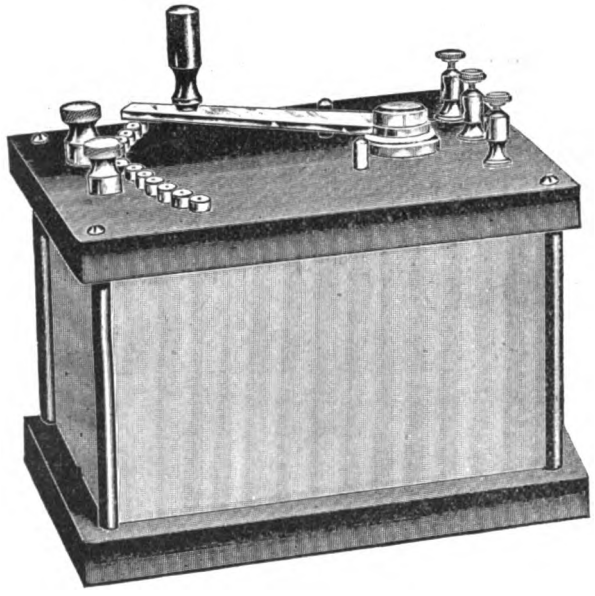
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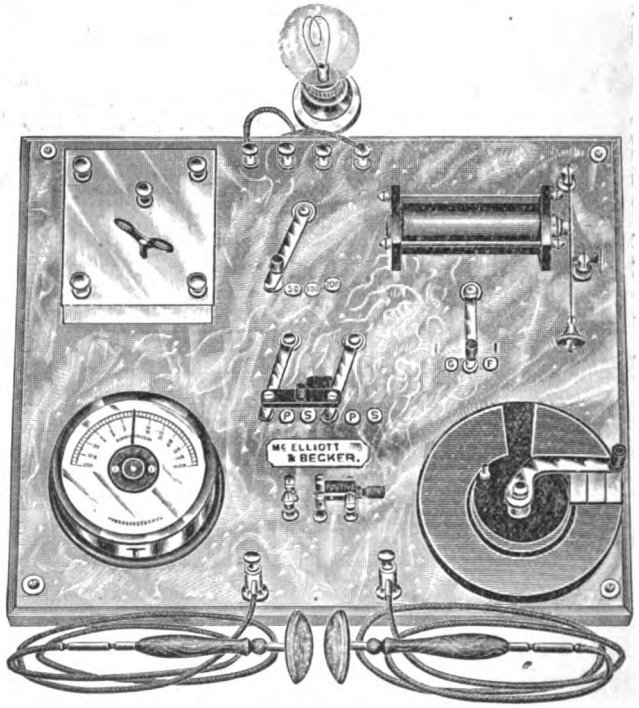
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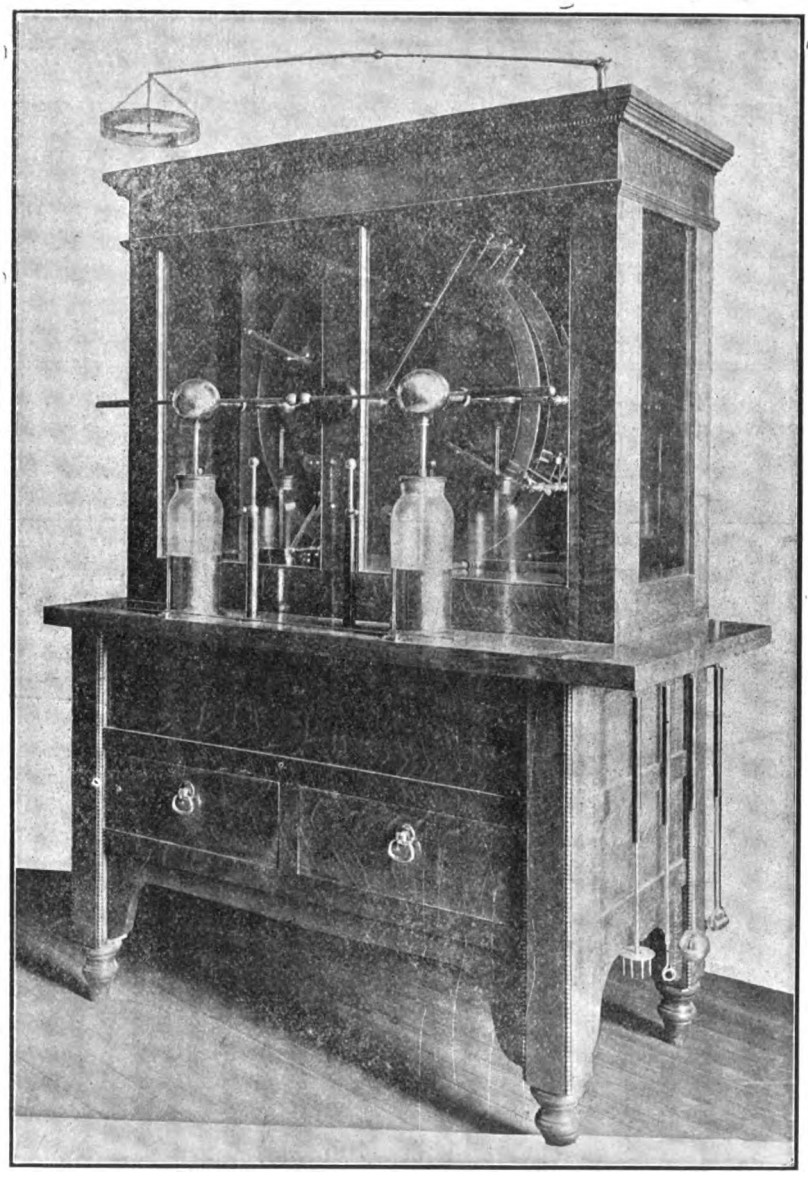
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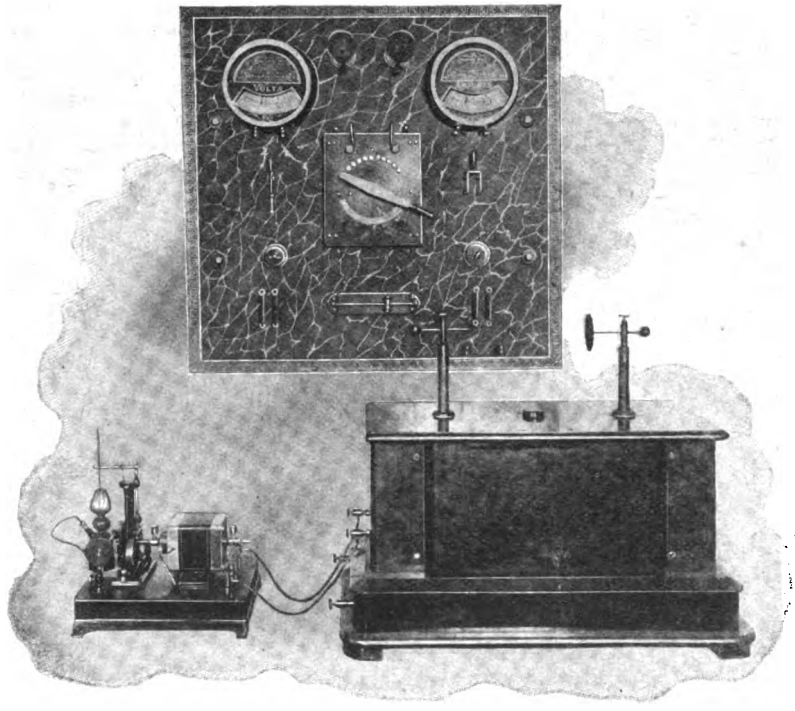
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AMERICAN
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A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. 1. CHICAGO, DECEMBER, 1901. No. 7.

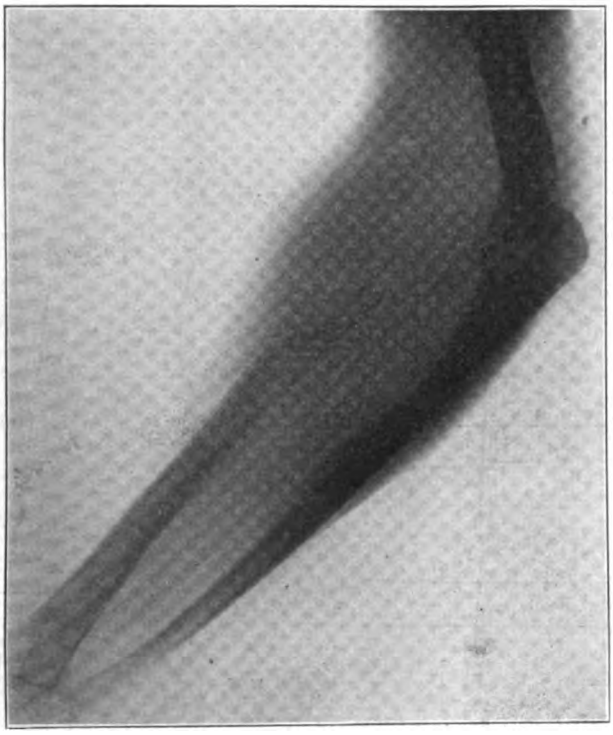
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TREATMENT OF OSTEO-SARCOMA BY X-RAY.

Reported by G. G. Burdick, M. D.

Paper read before the Chicago Electro-Medical Society, the patient being present for examination.

The case I report to you this evening is an osteo-sarcoma of the radius of three years' standing. The patient, whom you see, is seventeen years old. He was injured slightly by pulling three years ago; and, while it seemed trifling at the time, it was followed by pains and swelling, and was diagnosed as rheumatism. He comes of a perfectly healthy family, and





up to this time has been in fine health. For the last five months the pain has been so bad that it was necessary for him to take four grains of morphine daily, and could only rest at night by the application of hot water. Two months ago he, having heard of the treatment of cancer by the X-ray, called and had a consultation with me. He had been advised to have his arm amputated. On examination I found a large swelling on the forearm thirteen inches in circumference, stony hardness, and the hand and fingers perfectly stiff and useless. He was extremely emaciated from pain and loss of sleep. I did not hold out much encouragement to him, but offered to treat him (about August 1). The treatments were given three times per week, of a duration of six minutes. After the second treatment he had complete absence of pain, can rest good, and his appetite has improved wonderfully. After one month's treatment the fingers and wrist became useful, so that he could use them as well as he ever did, and a general softening of the tumor took place. After six weeks' treatment he was slightly burned, and we had to suspend treatment for four weeks, so it is only recently that he has been able to resume his treatments. The tumor has decreased in size one inch in circumference and two inches in length. The pain has not returned, and he is very much encouraged. The ultimate outcome of this case is still doubtful, but it is a fact that the growth has been arrested and we are all hopeful of a favorable outcome in the case.

[The arm was at this point examined by the members present, and the doctor was advised to go on with the treatment.—Ed.]

The second case that I wish to present is an osteo-sarcoma of the head of the humerus. The patient is a physician, forty-three years of age, who has been afflicted for three years, having been treated as usual for rheumatism for several years.

The trouble started by a soreness or pain, without perceptible increase of size for over a year, when a tumor made its appearance and gradually increased in size, and the pain and disability increased rapidly

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until the arm stood out from the side of the body at an angle of thirty degrees; and he was unable to place his hand in his trousers pocket. The pain has increased so much that he was obliged to use morphine liberally in order to pursue his vocation. He came to my laboratory during June, and as he had consulted a number of surgeons who, pronounced his case inoperable and urged him to submit to the X-ray treatment, I began immediately to treat him twice per week, he being unable to take more, as he lives seventy-nine miles out of the city. The pain yielded readily to the X-ray treatment, and he improved immediately in health and was able to leave off his morphine, and had perfect relief for three months. A gradual absorption took place until he was able to put his hand in his pocket, and he could use it without fatigue. The arm can now rest at his side, the shoulder can be moved at any angle without distress, and while the tumor is still hard and well defined, it has decreased considerably in size, and we are all encouraged to believe that eventually we may get a permanent cure. A curious condition noted lately is the extreme pain that is caused recently while submitting to the treatment, so severe that the prespiration pours from him in streams. The curious result lasts from 20 to 30 minutes before complete relief is obtained. No satisfactory explanation has been found for this result.

The method of treatment used is by means of a powerful coil, a moderately high-low medicinal tube, and the current is pushed for a period varying from five to fifteen minutes, due regard being paid to the possibility of a serious burn resulting—something which may be expected about every three or four weeks after beginning treatment, if not anticipated by extreme care.

3000 Michigan avenue, Chicago.

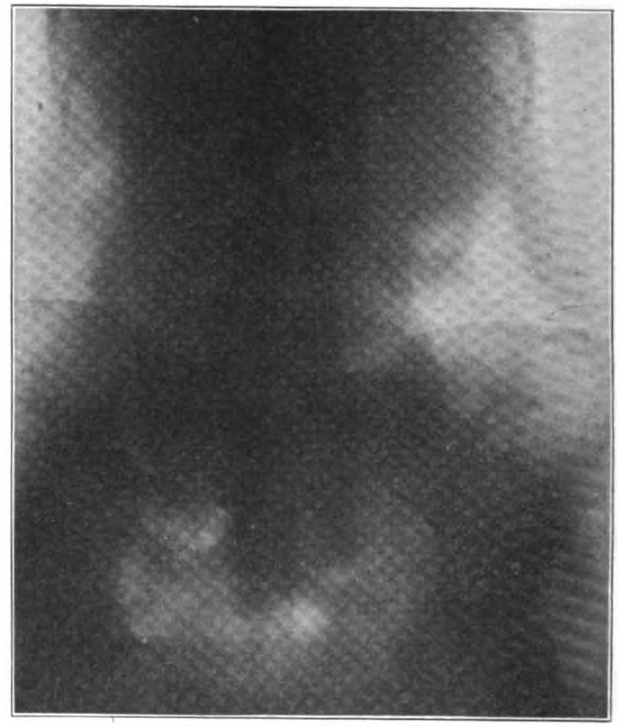
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REPORT OF A CASE DETERMINING THE VALUE OF X-RAY IN HEPATIC AND RENAL CALCULI.

On Sunday, Nov. 10, 1901, by special request of Dr. Byron Robinson, an X-ray picture was taken of Mrs. ——— at Dr. Pratt's X-ray and electro-therapeutical laboratory to clear up, if possible, an obscure diagnosis. The patient was placed in the dorsal position, a plate 11 by 14 was placed beneath the patient, so as to take in the region of the gall, bladder and kidneys. The tube was placed about fifteen inches directly above the body, and the plate was exposed a few seconds. Two exposures were made, one with the long diameter, and the other the short diameter of the plate along the spinal column, both together taking in the region from the coccyx to about the ninth dorsal vertebra.

On development two clear-cut negatives were produced, the clearness of which can only be appreciated upon inspection. Let us devote our attention for a while to a study of these plates or negatives, and if possible get a clear idea of the findings. To begin, the ribs extended downward so that the space between the twelfth rib and the crest of the ilium was about two inches. Lying in the right hypochondriac region, reaching partly into the umbilical region and extending into the right iliac fossa, was, according to both negatives, a dark mass which was interpreted to be a large cyst or pus cavity. Immediately above, but separated from it by a light hemispherical area, was a dark, round mass diagnosed as a stone in the region of the kidney. Upon the positive print the dark areas referred to were, of course, correspondingly light.

Being very much interested as regards the diagnostic value of these plates, and wishing to satisfy myself as regards their real value, I visited the Mary Thompson Hospital on Tuesday afternoon, Nov. 12, 1901, the day for the operation, which was performed under ether and chloroform anesthesia by Dr. Byron Robinson. As the diagnosis was as above stated, a



Simon incision was made, which did not disclose the source of the trouble in the kidney. A subsequent incision was made in the region of the gall bladder, and a large mass was disclosed extending into the right iliac fossa, quite a distance below the anterior border of the liver, which proved to be the gall bladder enormously distended with bile. Upon internal examination of the sack a stone was discovered in the common duct, which was removed with great difficulty. All the viscera apparently were very much displaced and bound by strong adhesions.

Now, to sum up the findings, the negative disclosed a dark area extending from the right hypochondriac

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region to and into the right iliac fossa, where the hypertrophied gall bladder extended, which evidently had freely transmitted the X-rays. The anterior border of the liver corresponded to the light hemisphere area, and the stone in the common duct cast the shadow that was diagnosed as a stone in the region of the kidney. Such a diagnosis will be appreciated when you realize that the gall bladder was found to lie directly in front of the right kidney.

The real lesson to be learned from these findings is the difficulty of the correct interpretation of X-ray shadows, which can only be obtained by constant comparison and observation at the operating table.

Stones do, as a rule, cast shadows lighter on the negative than the body tissue and the body tissue cast much darker shadows than the bony tissue.

In this particular instance the resistance offered to the X-rays by the gall stone and gall bladder was extremely slight, but enough, however, between the two to allow of differentiation.

It has been the case heretofore that stones have offered a greater resistance, and in consequence changing the character of the shadow, probably due to their chemical composition, and to verify this fact will state that Dr. Byron Robinson has operated on five cases where an X-ray picture has been taken in Dr. Pratt's X-ray and electro-therapeutical laboratory, and in every case he has found the stone, which to the X-rays has offered greater resistance than the one herein mentioned. It is extremely necessary to make an absolute differential diagnosis between an X-ray of hepatic calculus and renal calculus, as the operative procedure for each is entirely different.

As regards the peritoneal cavity, hepatic calculi require that the peritoneum shall be opened, and rena calculi does not require a peritoneal incision—a vast difference as regards the risk of infection.

More interpretation needed.

R. S. GREGG, M.D.

Chicago.

EFFECT OF THE X-RAY ON BACTERIA.

In the November number of the Journal of the American Medical Association we find a very interesting and exhaustive paper by F. Robert Zeit, M. D., upon the effect of direct, alternating, Tesla currents and X-rays on bacteria, from which we quote that which bears more directly upon the X-ray as a bactericide. He says:

"Burton exposed bouillon cultures of bacillus diphtheria for sixteen, thirty-two and sixty-four hours without any effect upon growth or virulence. Minck exposed an agar plate which had been inoculated with one loopful of bacillus-typhosus and exposed it for three hours at a distance of 10 centimeters from the tube. When incubated it showed no difference in growth from a control plate.

"Wittlin repeated Minck's experiments with bacillus typhosus-diphtheriæ, staphylococcus aureus and vibrio choleræ Asiaticæ, and concludes that Roentgen rays have no influence upon the growth or life of bacteria. Blaise and Lambue experimented with bacillus anthracis and found that three hours' exposure had no effect. They explain the favorable clinical results by phagocytosis, which may be caused by the rays.

"Bergonie and Mongour use the X-rays in the treatment of tuberculosis of the lung because they believe phagocytosis is caused. They were unable to reduce the virulence of tubercle bacilli by exposing the sputum to the rays.

"Muhsenn founth that tubercular guinea pigs were not improved by exposure to the X-rays. Schiff does not believe in any deleterious influence of X-rays upon tubercle bacilli in cases of lupus.

He believes that the violent inflammation caused in the deeper layers of the skin by the rays are sufficient to produce unfavorable conditions for the growth of bacteria. Rieder was the first to report germicidal effects of the X-rays. He was unable to kill well-grown colonies of bacteria on culture plates. He inoculated agar tubes and plated them out. The open plates were covered with a lead plate, from which a square or circle had been cut out. After a one hour exposure the plates were covered and placed in the incubator, with the result that the portion of the plate which had been covered bv lead showed numerous well-growing colonies, whereas the portion exposed to the rays showed no growth. By various arrangements for control of experiments he excluded heat rays, light rays and electrical effects. He thinks that he can exclude chemical effects, because bacteria inoculated afterward upon the portion exposed to the X-rays grow well. These experiments were repeated by others, practically with negative and partially with positive results. Rieder explains the negative results by insufficient intensity of the rays. Himmel thinks that deeper and more extensive necrosis is produced in lupus than in normal skin. Levy-Dorn expresses the view that the generally accepted opinion that the X-rays are bactericidal is wrong. Rieder's experiments were made with rays of great intensity, whereas in the therapeutic application of the rays, any bactericidal properties of the rays are out of the question. He compares the bactericidal effect of the rays with that of an attempt to disinfect the intestinal canal with a few drops of creosote, and believes the positive cures of lupus, favus and psoriasis and chronic eczema by the X-rays is not due to any direct bactericidal effect. After quoting these writers, Dr. Zeit says: I conclude from this that the Roentgen rays have no direct bactericidal properties. The clinical results must be explained by other factors; possibly the production of ozone, hypochlorous and nitrous acid, extensive necrosis of the deeper layers of the skin and phagocytosis."

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Commenting on the above, we would ask: How can they produce a necrosis without disassociation, which is electrolysis? How produce "a violent inflammation," without increased metabolism, which means electrolysis; or, in other words, hastened normal physiological change?

These changes can be carried to a point of electrocution, which means necrosis. This is electrolysis carried to an extreme degree. We know of no one who claims that bacteria is destroyed by the X-ray directly; but all concede that it is a process of electrolysis brought about through the electrolytic action, producing ozone, hyperchlorus and nitric acid, as well as alkaline changes in the tissues.

This change is a form of metabolism, which increases phagocytic activity. In referring back to pioneer work of Dr. H. P. Pratt in 1896, as published in scientific and medical periodicals, we find the following theory was advanced by him—viz., "that the magnetic force from the X-ray passes directly into the affected tissues; that electrolysis will result; during chemical decomposition oxygen will be liberated, which will unite with the oxygen of the body and make ozone. Ozone will kill all the bacteria that the body may possess."

We would also refer to the paper read by him before the American Roentgen Society at Buffalo, Sept. 11, 1901, which gives a full history of his work in 1896 and up to date the priority of its application in radiography by him being conceded by Prof. Roentgen himself. It is not the power of the currents that destroys, but the concentration of the lines of force thrown by the Crooks tube upon a given point.

In view of these opinions of eminent practitioners and investigators presented, we can but feel that there is need of carefulness still, and close examination not only of apparent results, but of all the conditions connected with these results, e'er we can say that we positively know just what are the therapeutic agents in the destruction of bacteria; though we do know that the X-rays are the means by which bactericidal results are obtained. These writers whom we have quoted are, all of them, men well qualified by reason of their thorough knowledge of physics to express opinion; and it seems to us that this knowledge of physics is a necessity, as we would place radio-therapy where it belongs —viz., upon a strictly scientific basis. For that reason we present the subject in this article before our readers as one worthy of careful consideration.—Ed.

The American Medical News for December has the following:

Camp-Followers of Science.

It was prophesied when the X-rays were first discovered that they would be exploited by quacks, as there is just that element of mystery and semi-miracle in them that takes in the credulous. We could not well anticipate their real therapeutic value, and we cannot say that it has even yet been fully demonstrated. It does appear, however, that they have a certain decided influence on living tissues, and the suggestion is a natural one that this can be applied to a therapeutic end. The success of the Finsen light treatment is also suggestive in this connection. Following out this idea some physicians have experimented with the therapeutic application of these rays and have reported encouraging results in cases of superficial malignant growths, while not claiming any more than logical scientific deduction can allow. There is, however, a class of men, few of them it is satisfactory to say, in the regular medical profession, who are a sort of camp-followers of science, seeking opportunities to pick up something out of new discoveries, or old ones still prominent in the public eye, that they can utilize for personal profit or notoriety. Some of these are comparatively innocent in their methods; they are mere vulgarizers, incompetent ones often, of scientific facts. Others, however, are less unobjectionable, and some recent instances have originated in Chicago and have lately taken up space in the daily papers throughout the country, and also, it is reported, in Europe, with alleged claims to cure deep-seated cancers and to destroy all germs by the X-ray. It is easy to report cures of anything the existence of which depends upon one's personal diagnosis and statement, if one is unscrupulous enough, and that sort of thing finds many believers. It is another thing, however, to demonstrate them to scientific observers; therefore, this kind of discoverer utilizes the daily press which finds his alleged achievements well suited to its sensational needs. What the X-rays can do in therapeutics has yet to be shown; the little we know is promising, but no man can truly say that anything more than a limited utility has been proved for them. Simple faith is a beautiful thing in some ways, but in alleged science of the newspapers and especially in the announcement of this sort of medical progress, a healthy skepticism is a better thing. The credulity that formerly exercised itself on ghosts and immaterial things is in this age of discovery lending itself to the fables of pseudo-scientists and often with even worse results.

Commenting on the above, we must say that there are two sides to the question. In the first place, we all know the conservative spirit of the older members of the profession, causing them to look with disfavor upon what is to them an innovation; yet at the same time we know that every day adds to the actual discoveries of men who are not less conservative, but more aggressive in their exploration of newly opened fields of observation. A brief glance at the pages of our medical journals reveals the fact that the physician who, six, eight or ten years ago, was well up in medical science, but who has not been a constant

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reader of our journals, is not considered "up to date" in our profession. And also we know that in the domain of electro-therapeutics very few have even attempted to keep up with progress made; and so, too, in X-ray work, that is in such brief period assuming such importance in the eyes of the world. While we do not think that there should be "rushing into print" of cases that are not as yet in the stage of certainty, we do not believe that the remarkable attainments made by skilled practitioners can be wholly kept from the daily press, whose reporters, argus-eyed, are everywhere searching for "the latest thing" to serve up to their readers. Nor do we think it "professional" to class those of our profession who are devoting their best energies to the uses of this newly discovered therapeutical agent, with "the by-gones of ghosts and immaterial things—the fables of pseudo-scientists," for the newly born science, though it is newly born, has for its godfather some of the admittedly brightest and most painstaking minds of our age, both in this country and Europe. These are not "camp-followers," but really pioneers; and we are glad to say that in this pioneer work "Chicago" is not behind in the march.

GOVERNMENT REPORTS—X-RAY BURNS—SPANISH-AMERICAN WAR.

X-ray burns are usually produced by prolonged exposures with tubes not working properly. There is very little danger if the apparatus is working well; for with a properly working apparatus prolonged exposures or close approximation of the tube to the body is not necessary. But two X-ray burns have been reported as a result of the use of X-ray apparatus during the Spanish-American war. One burn was produced by a coil, and one by a static machine. In each case the exposure was prolonged and frequently repeated, and the apparatus was not working at its maximum. The cases reported are as follows:

Case 1—T. McK., discharged; had received a gunshot fracture of the upper third of the right humerus during the Santiago campaign, for which excision of the upper part of the humerus was made. The next December an attempt was made to ascertain the condition of the bone. An exposure of twenty minutes was made, using a Fessenden coil machine, actuated by a dynamo current, with the tube (a low one) ten inches from the shoulder. The result was so unsuccessful that a second and third trial on successive days were made, but the tube was working so poorly that no satisfactory radiograph was obtained. Six days after the last exposure slight redness of the skin appeared on the front of the chest and shoulder. This erythematous condition increased, and two days later small blebs appeared. These broke and small ulcers formed, which gradually spread and coalesced. The tissue necrosis deepened and extended and was accompanied by marked pain and hyperaesthesia. The inflammatory action continued until the burn covered nearly the whole right breast. Treatment of various kinds was tried, but the greatest benefit was derived from continuous application of lead and opium lotion. The burn showed no sign of healing for four months. After that time it gradually grew better, but the healing process was very slow and the burn was not entirely healed until eleven months.

Case 2—W. C. B., admitted to the army general hospital at Washington Barracks, S. C., for pyelitis and hydro-nephrosis of the left kidney, supposed to be due to the presence of calculus in the pelvis of that kidney. An attempt was made to determine by radiography whether or not a calculus was present. Exposures of twenty-five minutes each were made every other day for three days with a static machine, but no calculus was found.

Five days after the last exposure an erythematous spot appeared on the left side of the abdomen. This gradually became quite pronounced in color and spread until it reached about the size of the palm of the hand. There was hyperesthesia of the part, but no ulceration occurred, and the irritation disappeared in about ten days, leaving no after effects.

It appears that the factors which influence the production of X-ray burns are: (a) The length of the exposure; (b) the nearness of the tube to the body; (c)the physical condition of the patient, and (d) the individual idiosyncrasy. Relative to the length of exposure, it should not exceed thirty minutes, for with this length of exposure any part of the body may be radiographed, provided the apparatus is working properly and good technique is used. If photographic results are not obtained with a thirty minutes' exposure, the operator should look to improving his apparatus or technique, rather than to lengthening the time which he exposes the patient to the action of the rays.

In regard to the distance of the tube from the body, ten inches should be taken as the minimum distance.

There is no doubt that the nearer the tube is to the surface of the body the more likelihood there is of producing a burn. A good apparatus, properly adjusted, will work readily through the head, chest or pelvis with the tube at ten inches; and in the absence of individual idiosyncrasy, with the tube at that distance, and the exposure not exceeding thirty minutes, there is no danger of a burn.

Personal idiosyncrasy and low vitality have always to be taken into account. The first, fortunately, is very rare, as it cannot be determined beforehand, the latter is always to be considered. A person in ill health or debilitated in any way is undoubtedly more likely to be burned by the X-rays than one who is strong and vigorous.

The well-known fact that weakened tissues easily

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yield to the disturbing forces holds with the action of the X-rays as with other factors, the action of which, if too long continued, devitalizes the cells. Exposures frequently repeated, with too little interval of time between them, will act in the same way as a single long exposure; the tissues disturbed by one exposure not being able to regain their equilibrium before the second exposure is made. It is to be remembered that the pathological effect of a destructive X-ray exposure is not at once apparent, the first appearance of a burn not showing itself for two or three days. It is quite possible, therefore, to seriously increase a trouble already started, if a second exposure is made within that time.

For this reason it is a good rule, where a thirty minute exposure has been made, not to repeat the exposure within three days. With exposures of shorter duration the danger of repetition diminishes *pari passu* with the length of the exposure.

IS CANCER CURABLE BY ROENTGEN RAYS?

If it is true that the germs of cancer can be destroyed by the Roentgen X-ray, as the experiments of Dr. John E. Gilman of Hahnemann Medical College would seem to indicate, it will be as great a boon to humanity as the discovery of Dr. Koch that tuberculosis is a germ disease, is not hereditary and not necessarily incurable.

Notwithstanding the claims of the "cancer specialists," cancer has been generally regarded as fatal. Lowell in his "Biglow Papers" gave expression to the medical as well as the popular belief about cancers when he said:

There's nothing for a cancer but the knife,
Onless you set by 't more than by your life.

The experience of surgery, however, has shown that the knife, even when most skillfully wielded, affords but temporary relief, if it does not prove fatal. Popularly speaking, a cancer is a malignant growth of new tissue, usually in the form of a tumor, which tends to ulcerate and which will recur if removed. If not removed it usually infects other parts of the system at large and finally proves fatal.

It was soon discovered by physicians that the Roentgen rays had great power in the destruction of disease germs. Dr. Gilman, as well as other physicians. have found the rays of great value in killing the germs of tuberculosis, and hence a valuable aid in the treatment of consumption.

A year and a half ago Dr. Gilman began experimenting with Roentgen rays in the treatment of cancers. While it was well established that the cancer tumor is a growth of abnormal tissue in an abnormal place, Dr. Gilman maintained that it was also a germ disease, that the germ develops the cancer cells and the cells stimulate the growth of the wrong kind of tissue, which makes up the bulk of the cancer. That he has succeeded in killing these germs with the Roentgen rays in a number of well-known cases, thus arresting the growth of the cancer cells, and by giving remedies to supply the inorganic material needed, completely disintegrating the tumor, is what he appears ready to vouch for.

The substitution of the Roentgen rays for the knife in the treatment of cancer will certainly mark a wonderful advance in medical science and will confer a great boon upon humanity.

X-RAY IN AFRICAN CAMPAIGN.

Dr. John Hall Edwards, surgeon radiographer of the Imperial Yeomanry in South Africa, says: Military surgery must be rewritten in face of the new facts discovered by means of the X-ray. Dr. Edwards, who was in charge of the Roentgen apparatus during the campaign, made hundreds of examinations of wounded, with many marvelous results. He is convinced that it is demonstrated by results, the necessity of adding to the Army Medical Corps a properly constituted X-ray department, and of training its members to use the apparatus with readiness in cases of emergency.

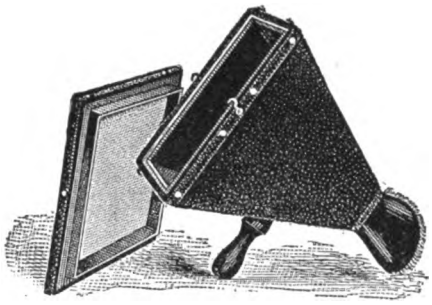
He says further:

"Timeworn, useless and dangerous methods for the location of hidden bullets can be forgotten, the X-ray furnishing an aseptic, scientific and absolutely accurate method. The altered conditions of warfare have necessitated considerable alterations in surgical methods. The high velocity of the new firearms leaves fewer bullets in the tissues, but these few are usually so far from the entrance of the wound that no probe is capable of reaching them, and apart from the X-rays there is no method of finding them.

"It is now possible to examine the whole body in a few minutes, and to find a bullet, no matter where situated, without inconvenience or risk to the patient. Actual experience has taught that although upon the battlefield the X-ray is superior to the old methods of diagnosis, there is little necessity for the use of the apparatus in such an advanced position. The whole of my work in South Africa was done in hospitals. If the work is to be well done it must be done under favorable conditions. Localization requires exactitude. It cannot be properly performed under rough and tumble circumstances."

We take great pleasure in announcing that Dr. G. G. Burdick, associate professor of surgery, post-graduate of medical school, has been added to the faculty of the Illinois School of Electro-Therapeutics. His field of work will comprise radio-therapy and photo-chemistry. We congratulate the institution on its fortunate choice, as Dr. Burdick is known to be one of the best experts in X-ray work.

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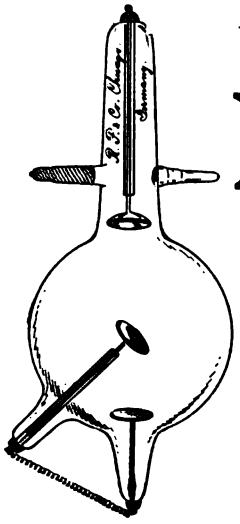
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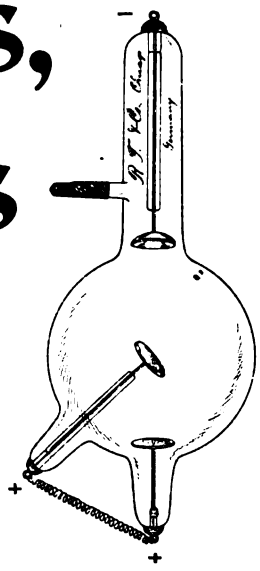
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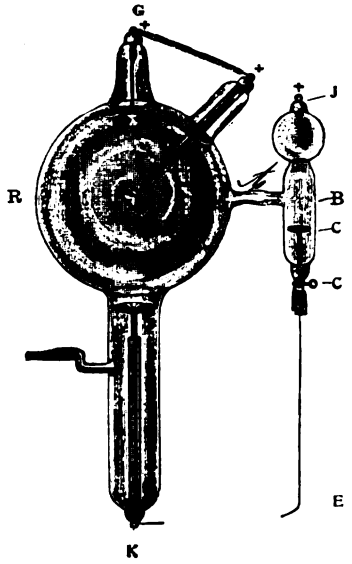
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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

NOTICE.

The next regular meeting of the Chicago Electro-Medical Society will be held on Monday evening, Dec. 30; at room 1301 of the Champlain Building.

MEETING OF CHICAGO ELECTRO-MEDICAL SOCIETY

The annual meeting of this society was held Tuesday evening, Nov. 26, at 1101 Masonic Temple. Dr. G. G. Burdick in the chair. As it was the annual meeting, no papers were read, but the evening was devoted to business, such as would naturally come before it, which our readers will find fully reported by the secretary in this number.

We will find the society now fully launched in its own appropriate field of investigation and practice, and a glance at the list of newly elected officers will give to our readers assurance that the society will be one that will successfully handle with scientific care the subjects and papers that will come before it for consideration. For the past, we can say that every meeting of the society has been of interest to the profession, both in papers submitted and the discussions following. Many eminent physicians from other cities and states, who have visited and by invitation have taken part in these discussions, have expressed themselves as both pleased and surprised at the high standard of these discussions and the evidence of the advanced achievements already attained, showing that Chicago is in this line, as in so many others, the real leader in science and theraopathy—second to none. We congratulate the society upon its attainment, and prophesy for it a world-wide recognition among the thought leaders and discoverers of the age.

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO-THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue.

We are in receipt of volumes 2 and 3 of the series of Physiologic Therapeutics from the Blakiston Press, Philadelphia. Like the preceding volumes, these are carefully prepared, and possess real merit worthy a place in the physician's library.

The Cosmopolitan Osteopathy comes regularly to our table, and whatever we, individually, may think of osteopathy, either as a "science" or a "fad," the journal is full of interesting reading, and is neat and tasty in its typographical dress, and worthy the support of those of that school.

We are in receipt of a series of papers, issued by the Michigan State Board of Health, very interesting in statistics and showing the real value of such state boards in the prevention of contagion.

The Chicago Pan-Path is a bright little paper that comes regularly to our table. It contains many items of interest to physicians, and especially to medical students.

ELECTRIC TREATMENT OF EXOPHTHALMIC GOIRER.

Regnier of Paris (Journal of Electro-Therapeutics) uses a galvanic current, applying a negative pad twenty sq. cm. at the back of the patient, and a positive pad eighty sq. cm. over the tumor in the neck. A current of from five to ten ma. is used, and is applied from twenty to thirty minutes. Treatments are made every other day. Six cases are perfect cures. No return has been manifested in three years. Three cases were improved and one abandoned treatment after a few seances. This last was a young girl with unilateral goiter and exophthalmia on the right side. Electrical resistance on the right side was 800 ohms; on the other it was 1,200.

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RECOGNITION OF X-RAYS AS A CURE FOR CANCER BY OUR ENGLISH PRESS.

We quote from press dispatches the following, especially as it gives credit to our profession in America as the real pioneers in this branch of electro-therapeutics:

London, Dec. 7.—X-ray cancer cures in America are attracting much attention among British physicians. The Pall Mall Gazette publishes a letter signed "Doctor, London Skin Hospital," in which the writer says that, in addition to treating face cancer by the Roentgen rays, the hospital is now treating breast cancer with definite results. The letter ends: "After twelve months of usage I firmly believe that the Roentgen ray is the most powerful therapeutic agent in the cure of cancer."

BONE REMOVED FROM BRAIN.

Boy Undergoes Remarkable Operation at Baptist Hospital.

Harold Hasbrouck, the 15-year-old son of Louis Hasbrouck of the insurance firm of Rothermel & Hasbrouck, was the subject of a remarkable surgical operation a few weeks ago, which is expected to relieve him of part paralysis from which he has suffered since his birth. His skull on the left side of the head above the ear was seriously injured at the time of his birth, but it was never known that his paralysis and his accompanying difficulty of speech were due to that until an X-ray picture was taken a short time ago. He was operated on by Dr. Robert Dodds at the Chicago Baptist Hospital, and it was found that a piece of bone projected into the brain for several inches. There was a thickening of the skull in another place. The boy stood the operation well, and the only one of his troubles which his physician says may remain with him is the paralysis of the right leg.

X-RAY IN DIAGNOSIS OF KIDNEY DISEASE.

By George H. Stover, M. D., Denver, Colo.

For some purposes in renal surgery the X-ray is claimed by certain men, particularly by Leonard, to be of very decided value or almost indispensable. Leonard claims that information as to the presence of calculi in the kidney may be derived from skiagrams with much more certainty than by other methods of examination. He cites one case which had three calculi weighing less than one grain, which were shown by a skiagram; in 136 suspected cases, a negative result was obtained in 100; in only one of these was the diagnosis disproved by operation, and in that instance the error was believed to be due to a defect in the plate on which the skiagram was taken.

Dr. Keene removed a calculus 12 millimeters in diameter, which two skiagraphic examinations had failed to discover.

Dr. Williams of Macon, Ga., reports three unnecessary operations which were made, due to the false information given by skiagrams.

It requires a great deal of skill to properly interpret many skiagrams, and it may be that some errors are due to faulty interpretations of skiagrams.

Personally I am not so enthusiastic in this matter as some others are. Several years ago I made a fluoroscopic examination in a case sent by Dr. Van Meter but failed to see a very large calculus which the doctor subsequently removed. A skiagram which I made a while ago for Dr. Parkhill did not show a calculus, and in the operation upon this kidney for another condition, no calculus was found.

It should be remembered that only calculi consisting of oxalates and phosphates are shown by the X-ray, the other varieties casting no shadow.—Colorado Medical Journal.

X-RAY THERAPY.

S. S. Cohen, A. M., M. D., says: The application of the X-rays in therapeutics might be termed "Roentgenism," to harmonize with the terms "Franklinism," "Galvanism" and "Faradism." That these radiations of great rapidity of vibration are capable of exciting molecular changes, both of physical and chemical, in the substances they traverse, or in which they become absorbed, their fluorescent and graphic effects are sufficient evidence. Theoretically, therefore, one would expect physiologic effects as well, and the potentiality of the physiologic effect implies also that of pathologic effect and that of therapeutic utilization. Pathologic effect, moreover, has been demonstrated as being due directly or indirectly to the action of the X-rays or some accompanying influence, in the irritation and destruction of the cutaneous structures, known as "X-ray dermatitis." Peculiarly suggestive of profound molecular perturbation is the fact that these effects may not appear until many days or even weeks after the exciting exposure. It is likewise significant that rays from high vacuum tubes, which easily penetrate the tissues, are at least far less likely to produce ulceration than those from low vacuum tubes, which, whether X-rays or some unrecognized mode of motion be the active agency, are less able to overcome resistance, and may thus exert their perturbing effect chiefly upon the obstructing tissues.

Numerous attempts have been made to utilization of "Roentgenism" in therapeutics, but this far with few definite results. On some forms of bacterial growth its influence seems to be destructive, but upon others stimulant, and exact knowledge as to the conditions necessary for either effect upon any one organism or upon organisms in general is still lacking. Contradictory reports have been made as to its influence over the function and nutrition of the various organs of the animal body in the normal state, and under pathologic conditions.

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It would, therefore, be unprofitable in a writer dealing with established facts to cite these conflicting statements. Suffice it to say that "Roentgenism" has been advocated in the treatment of hysteria and neurasthenia; of all diseases of the skin; of neural degenerations; of the various infective fevers, especially in the attempt to "jugulate" or abort the disease; of pleural effusions, of unresolved pneumonies; and of chronic pulmonary tuberculosis; of chronic rheumatism; of carcinomata, external or internal; and of other forms of functional and organic disease of nearly every organ of the body.

Psychically, its suggestive power is undoubtedly great. Either thus, or by more direct action, it has in many authentic instances relieved, for more or less protracted periods, muscular, articular and neural pains of various origins. This power was strikingly illustrated in the case in which Dr. Max J. Stern, at the Philadelphia Polyclinic, obtained the first skiagram of a foreign body in the eye; unexpected results of the exposure being the oncoming of natural sleep and the permanent relief of pain theretofore scarcely controlled by opiates.

Physically, definite success has been achieved in the relief or cure of lupus vulgaris, and perhaps in other cutaneous diseases or disorders.

This is extremely suggestive as to possibilities in laryngeal tuberculosis, if the occurrence of laryngeal edema can be guarded against. The radient energy concerned might likewise be useful as a destructive agent after operative procedure in neoplasms, if the technic of its application could be properly developed. —System of Physiologic Therapeutics, Vol. 2, Blakiston.

ELECTRO-THERAPEUTICS.

Dr. B. Jackson, M. E., of Springfield, Mass., has written an excellent article for the Electro-Therapeutist upon this subject, from which we make the following extract:

Faradic, galvanic, static and the sinusoidal currents of electricity, when generated by modern apparatuses, are to-day attracting the attention of our best medical men; and the science of the future will have more to do with those forces of nature, such as light, heat, electricity, etc., than with crude drugs.

We are sorry to say that there are many intelligent doctors, even in this enlightened age, who will persist in condemning an agency which they have never tried thoroughly, if at all, and insisting that, because they have not succeeded with it themselves it is worthless or harmful. Many say this of electro-therapeutics, and antagonize, openly or secretly, their more liberal or successful brethren, and make light of their efforts and the results obtained, and call them "cranks." But "facts are stubborn things." The world's machinery could not move without the crank, and such men as Watt, Stevenson, Morse, Harvey (not of Boston), Jenner, Franklin, Marconi, Edison and Tesla are "cranks," but very useful ones. Patient, scientific, careful electro-therapeutics is another useful crank, which is overturning some old fossil medical notions. Verily, "there are more strange things in this world, Horatio, than are dreamed of in thy philosophy."

Electricity begins its remedial effect immediately upon being applied, and is much more prompt in its action than are most drugs.

Electricity avoids the hemorrhage caused by many operations.

Electrical treatment obviates the necessity of an anesthetic.

Electricity produces a powerful physiological effect, which in many instances is of great value.

It does not retard the action of any remedial treatment that may be used, as is frequently the case when different drugs are employed.

The science of electro-therapeutics is one of the most tangible, positive and practical in the domain of medicine and surgery. And the physician who attempts to ignore or belittle its claims is simply displaying his own ignorance and getting in the way of a power that will speedily convert him or sweep him aside in its onward progress. In the field of surgery its demonstrations are open and undeniable. The electro-cautery and the galvanic currents are positive and palpable in their work on the tissues, morbid growths and in cataphoresis. The galvanic and faradic currents in general diseases and in diseases of the nervous system are applicable in the widest range of troubles, and yields results that cannot be accomplished by drugs, exercise or massage alone.

To those who are skeptical we do not wish to bring a new doctrine, but would refresh their minds on subjects that are old in this connection. A glance will show that the entire nervous system receives and transmits its impressions and influences purely as an electrical battery, which it is essentially. When we consider that every element in our bodies is either electrically negative or positive, we must see that we are the most thoroughly constructed, sensitive and readily affected electrical machine that can be found.

SKIAGRAPHY IN THE DIAGNOSIS OF CHEST DISEASES

Drs. Walshan and Beal of London Medical Society say: That to obtain a satisfactory shadow, either upon the fluorescent screen or the sensitive plate, it is necessary to employ a powerful coil, capable of yielding a twelve or thirteen inch spark. The patient should lie on a couch or table, face downward, the sensitive plate, duly protected from light and injury, being placed under the chest, and the tube from two feet to three feet above it, great care being taken that the anti-cathode in the tube should be placed exactly vertical to the part of the chest to be examined. An

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exposure of two minutes is, as a rule, sufficient in the case of the chest, but the greater the distance of the tube from the object the longer should be the exposure.

In observations with the fluorescent screen the tube must of necessity be closer to the chest wall, and allowance had then to be made in interpreting shadows, for the apparent enlargement of the tissues lying nearest to the tube, owing to the divergence of the rays. It was always advisable to examine with the screen from the back as well as from the front, and useful information could often be obtained by diagonal observations. No danger need be feared where the rays were passed only for a few minutes at a time. Cases of dermatitis have been from time to time reported, but in such instances the exposure had been excessive—namely, from half an hour to two hours. To interpret morbid shadows, it is necessary to study those thrown by the normal thoracic tissues. Several skiagraphs of healthy chests have been shown, in which the shadows of the heart, diaphragm and mediastinal tissues are clearly seen, but in addition certain faint streaks near the left side of the heart, and both sides of the mediastinal shadow. These are due to the pericardium and visceral pleura. The shadow of the scapulæ, the anterior axillary fold and in some cases of the nipple, must be recognized as normal, but they are easily identified by moving the arms. Healthy lungs are shown to be translucent. It has long been recognized that advanced tuberculous changes show definite shadows, but the very earliest deposits of tubercle do not yield any appreciable shadow. The more advanced the disease the darker will be the shadow, especially where caseation is in progress.

Cavities are indicated by light areas in the midst of dense shadows. Fibroid changes and adhesions only give rise to a shadow after they have attained a definite density, and these shadows differ considerably from those thrown by tubercle. Emphysema is indicated by exceptional translucency of the affected parts of the lung. In early dry pleuritis only a very faint shadow can be detected. Serous effusion causes a faint blurring of the rib shadows, but does not obliterate them, but the upper margin of the fluid frequently shows a clear line of demarcation. Purulent effusion, on the other hand, causes very dark shadows. A tube of pus removed the pleural cavity gave a shadow almost as dark as bone, and very much darker than the shadows of a similar amount of fluid blood or serum. Abscesses, like caseating nodules, throw dark shadows, and even through thick tissues, such as the kidney, caseous tuberculous nodules have been shown to be clearly discernible. In heart diseases the rays seem to be of less diagnostic value. The most important use of skiagraphy in chest disease seems to be for the detection of morbid growths and aneurysms.

M. Nodon has described a new and highly interesting method of obtaining X-rays. It appears that if ordinary light falls upon an electrified aluminum plate, preferably upon one electrified negatively, the light penetrates the plate and issues from the other side in the form of X-rays.

MEDICO-LEGAL ASPECTS OF SKIAGRAPHY.

An article of interest, by Mr. Golding Bird of Guy's Hospital, in reference to the medico-legal relation of skiagraphy in cases of fracture, has recently appeared in the British Medical Journal. It deals with the grave danger that may arise from the use of X-rays in fractures by the general public, and from the interpretation that they choose to put upon the skiagraph for which they have paid; and it warns the profession not to play into the hands of the public by injudiciously advising their patients to "go and get X-rayed," and thus perhaps provide them with a weapon which may be used against their medical adviser. Mr. Bird quotes instances in which a skiagram has shown what appears to be a fracture where none exists; others in which a fracture has been missed altogether; and others again in which, owing to the well-known translucency of young callus to the X-rays, it is possible to show a fracture which has united sufficiently to bear weight as still existing; and he arrives at the conclusion that skiagraphy should be employed only as a subsidiary agent in diagnosis, and that even in this secondary capacity its evidence in cases of difficulty and doubt should be received with caution, and only after due interpretation by some one whose experience warrants his speaking with authority. We have repeatedly called attention to the conclusions at which Mr. Golding Bird has arrived, and instances of the various misinterpretations which he quotes must be familiar to our readers. With his conclusions we are thoroughly in accord—that whenever skiagraphy is called for in medico-legal cases, only a skilled operator's picture should be used, and its interpretation should be left to an expert, who is a professional man, and at least well acquainted with X-ray work. Neither lawyer nor photographer, but only a professional man, can estimate the relationship that the skiagraphic appearance in any case of fracture bears to the clinical result produced by the treatment. But we do not regard this, we have said, in any way as an argument against the value of the method. Those who have conducted a large histological class of medical students must be well acquainted with the marvelous appearances that may be produced in microscopic slides made from perfectly normal tissues. But to use this as an argument against the value of the microscope in diagnosis would be absurd. The fault

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is in the technique and in inadequate experience in interpreting results, not in the X-rays.

The above, which we quote from the "Archives of the Roentgen-Ray" of London, England, we consider of great importance to the profession, as we already know of cases where suit has been instituted against the attending surgeon, based upon skiagraphs taken by non-professional operators.—August Number Archives of London Roentgen Society.

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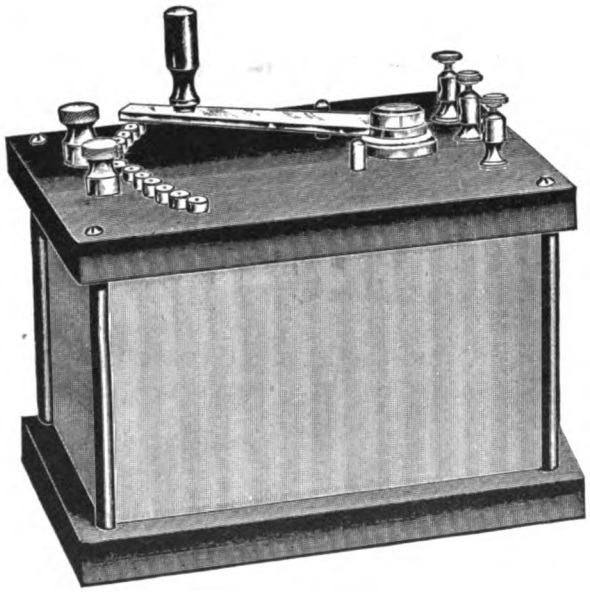
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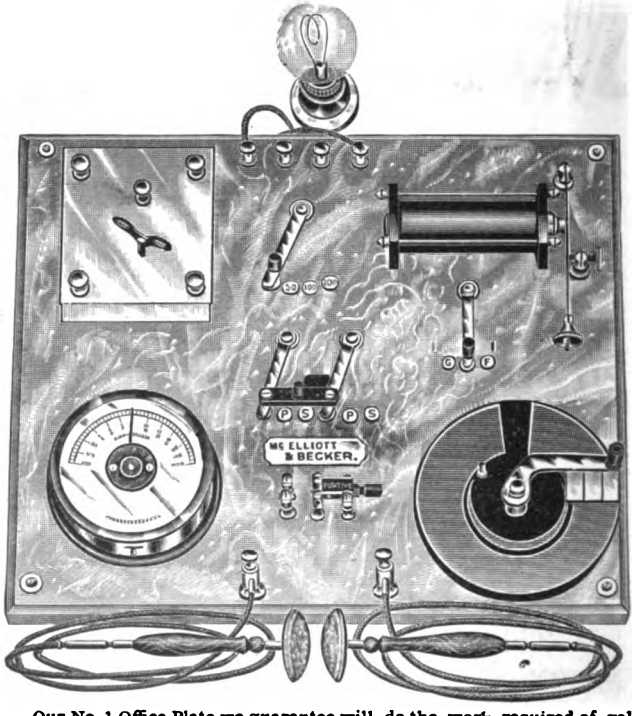
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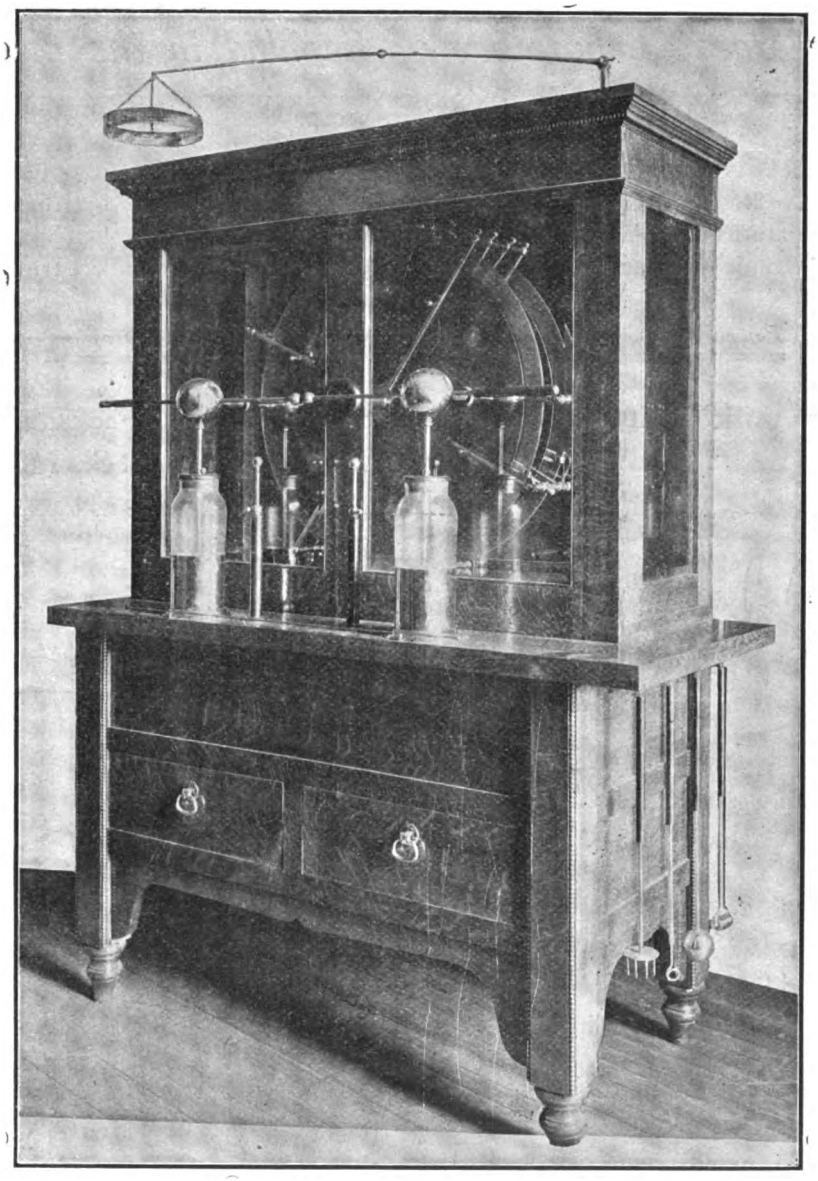
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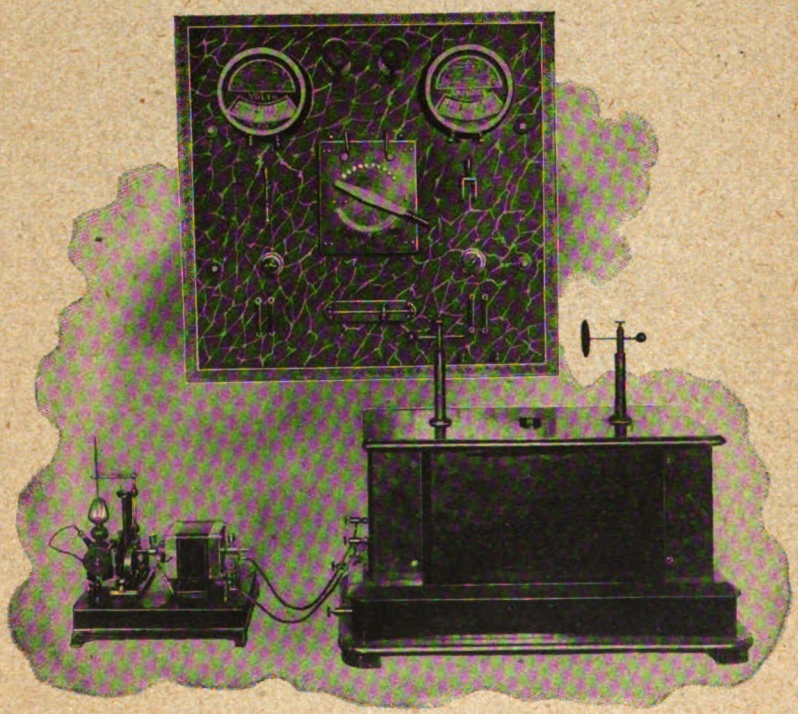
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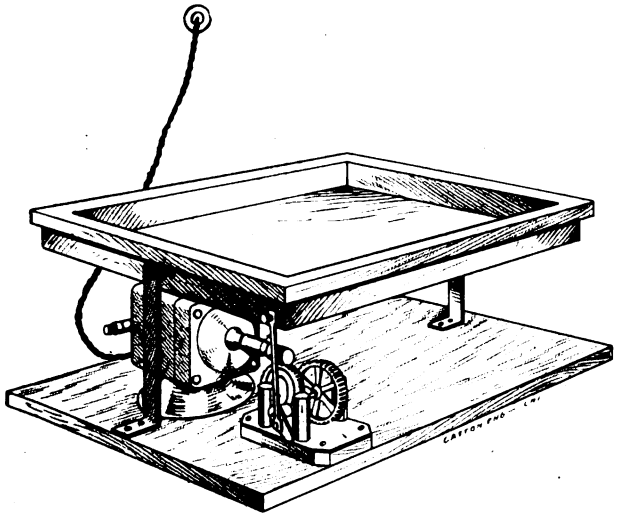
A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, JANUARY, 1902. No. 1.

Special to the Electro-Therapeutic and X-Ray Era.

AUTOMATIC ROCKING TRAY.

The apparatus represented by cut was designed by Dr. Gordon G. Burdick, and presented to the Chicago Medical Society at its meeting in November, with the following remarks: The object of this machine is, to be a time saver in the developing of photographic plates. It has been known for some years that the average physician fails to get good results in the development of X-ray negatives due to various reasons, principally because of a dislike to spend sufficient time in the dark room to properly develop a negative.



He has compromised the matter by using an extremely sensitive photographic plate and a developer, very rich in alkalies, in order that he may complete his work in the shortest possible time and go from the dark room into the natural light. This process is responsible for the nasty muddy X-ray negatives which are seen everywhere. The proper paraphernalia to get a first-class result in the X-ray negative is a slow plate, the most valuable because the plate is not so sensitive to the ordinary dark room light and contains in the emulsion more free bromide of potash, therefore it does not fog or veil so quickly as the ordinary plates which are used in process by emulsion. The quickness of the photographic plate is of no special importance when used for X-ray processes, inasmuch as the X-ray light passes directly through all the emulsion which can be prevented by putting a great number of plates together, therefore if the physician expects the best results in X-ray work, isochromatic or extremely rapid plates are not suitable.

This apparatus which I have designed is automatic in its action, the plate, after exposure, is put into the tray, flooded in the usual manner and when the firm is completely wetted it is set in the automatic rocking tray and a developer is used which gives a good printing contrast. It takes about one-half hour in the development for ordinary radiographs of the limbs, it is possible in radiographs of the trunk to prolong the development for an hour or two in order to give sufficient printing contrast to the ordinary trunk negatives. When a short exposure of the trunk is desirable prolonged development will yield a negative rich in detail and of sufficient printing contrast to give an excellent positive print.

The difficulty heretofore has been overcome by means of "tank development," where an extremely weak developer is used and the negative allowed to soak from two to ten hours, according to the part of body radiographed. The object of this method has been the tendency to deposit crystals upon the photographic film as well as staining the negative from prolonged contact with the solution. The negative developer by this method never produces the sharp crispness and brilliant detail obtained by the rocking method development.

The physicians whose time is valuable, has merely to take his plate; set it in the rocking tray and cover it up, go about his business and look at it from time to time if desired, without any detention in the dark room whatsoever, a little experience with exposure and the use of one or more developers for different purposes will quickly improve their technique until they arrive at a position where they can anticipate the complete development of the negative by this manner, consequently they may feel relieved of all anxiety as to the result.

The developer used in this method was rich in bromide of potash, which has a chemical restraining action over the developer in its action upon reduced metallic silver, therefore as a time saver as well as doing away with the bad air of an ordinary dark room, it is worth its weight in gold. The apparatus, as you see, is constructed of a tray mounted upon rocking arms, with a 1-20th horse power motor with a reduction gear

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and rocks the tray by means of an ordinary well known eccentric motion. The tray is not supposed to contain a plate but is for the use of ice in hot weather. The tray containing the photographic negative to be developed is set on it, thus keeping the developer at a proper temperature and preventing the frilling or fogging of the plates in the process of development from the high temperature.

In cold weather warm water may be used instead of ice for the tray, thus if the dark room is unusually cold development can be kept at a proper temperature of about 65 degrees Fahr., to give the sharpest and crispest deposit.

CRITICISM OF A STATEMENT MADE BY DR. W. A. PUSEY.

(Paper read by Dr. H. P. Pratt before the Chicago Electro-Medical Society, followed by discussion.)

I notice in the December number of the American X-Ray Journal a letter from Dr. W. A. Pusey of Chicago, in answer to a letter of inquiry in relation to a reprint of his published on the X-ray in the treatment of skin diseases, in which he discourages the use of the static machine for X-ray work in treating acne, hypertrichosos, sycosis, etc., and gives reasons for the same. The following is a quotation from his letter in the Journal: "It is necessary that all the factors involved in producing the light (X-rays) be definite and that there be repeated exposures to a weak light, the effect of which may be controlled, rather than the use of a strong light for a few exposures. As I said in that paragraph, I use the technique suggested by Schiff and Freund, described in my previous article, in which the light is produced by standard current of twelve volts and one and one-half amperes and a coil of 30 C. M. spark length. I believe it is only by maintaining your factors definite and using a weak light that you can pursue the method with safety in all cases. The light produced with the static machine is in quantities which are greater than is safe to use repeatedly for long exposures, and there is no way of accurately determining the factors in the production of light."

Such statements as these are misleading and misrepresent the facts, and physicians having a thorough knowledge of X-ray physics will bear me out in this statement. It is true that there is yet a good deal to be learned about the physics of X-rays, but if there is one thing that all experienced operators have demonstrated to a certainty, it is that it is impossible to maintain definite factors.

The force projected from the vacuum tube is electrostatic in character and of very high potential, it acts on matter in the same manner as any electro-motive force; that is to say, it produces a dissociation of molecules along its line of force, which is electrolysis. The light which is emitted from the vacuum tube is the result of the decomposition of the molecules in the atmosphere around and inside the tube. This light is not the X-ray current, the X-ray force is purely electrical and is invisible. It appears to me that if we consider the X-ray as an electric current of very high potential which makes its circuit from the inner surface of the tube outward, perpendicularly to the surface, then radiates in straight lines until the potential falls, when the rays return to complete their circuit by the terminals, we have a simple and practically useful explanation of all the phenomena.

The X-rays are produced by the bombardment of the molecules of residual gas against the inner surface of the tube. The number of molecules of gas in the tube determines the degree of vacuum. When the tube is excited some of the molecules of gas are thrown from the cathode, striking the platinum disc or anticathode, which serves as a target, causing the molecules to rebound and strike the inner surface of the tube. This point of impact on the inner surface of the tube is the source of the X-ray. Every molecule of gas striking the inner surface of the tube causes one or more lines of magnetic force to be thrown out at right angles to the surface of the tube. The distance to which the lines of force are projected, or, in other words, the limit of the penetrating power of the ray, depends entirely on the potential of the tube, and this in turn depends on the force of impact of the individual molecules of gas. The higher the vacuum the less the number of molecules of residual gas in the tube, the greater the free path the higher the potential, and the greater the penetrating power. The lower the vacuum the greater the number of molecules, the less the free path, the lower the potential and the less the penetrating power. The force projected from the X-ray tube, being electrical, must follow Ohm's law. The current is equal to the electro-motive force divided by the resistance; that is to say, the potential of the tube may be measured in volts, the resistance of the X-ray current measured in ohms, the amount of current measured in fractions of an ampere, and the amount of work done measured in a fraction of a watt. To obtain the measurement it requires an expert physicist, the poor doctor is not in it.

So you will see there are three factors that enter into the problem of the X-ray current—the potential, the resistance, the current—with no one constant factor. They vary with each excitation of the tube, this variance is due to the degree of vacuum and the force of impact of the molecules of residual gas on the inner surface of the tube. With each excitation of the tube the vacuum increases, thereby changing the other factors, so that the main and almost the only factor is the degree of vacuum in the tube, and not the form of apparatus used in exciting the tube. The degree

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of vacuum required varies according to the part being treated, and can only be determined by close observation of the working of the tube and the susceptibility of the patient to electrical influence. This is the whole thing in a nutshell. There is no one method that can be followed, you must vary the factors to suit the case. If Dr. Pusey is of the opinion that with a coil of thirty C. M. spark length, voltage of twelve and an amperage of one and one-half he can maintain a definite amount of energy in the tube, he is laboring under a misapprehension. He must study the tube factors first and vary the other factors to suit. While the amperage and voltage is for all practical purposes constant, the work that is being done is almost entirely confined to the tube, which is constantly changing the degree of radiation. The doctor has the cart before the horse.

The tube's radiation should be kept constant, as far as possible, by varying the force in the apparatus which energizes the tube. It must be remembered that the tube varies with each excitation, and consequently it requires an increase or decrease of the amperage on the primary circuit to keep the tube at a comparatively constant radiation. But this is absolutely impossible, as the vacuum increases every time the tube is excited, consequently changing the degree of the radiating energy. It must not be forgotten that the X-ray current produces an electrolytic effect on the tissues of the body; this electrolytic effect is increased or decreased according to the number of lines of force emanating from the tube.

All substances through which the X-ray passes form part of the X-ray circuit. When this radiating energy comes in contact with the tissues, it changes the relationship of the ions composing the same, producing an increased metabolism. The static machine can be harnessed up by an expert to produce the same results as the doctor obtains from his coil.

The doctor's criticism brought out considerable discussion. Mr. Friedlander was called upon to state his experience with X-ray tubes when operated by different coils and static machines. He stated that the same tube would fluoresce very differently when attached to different static machines. The same held true with coils.

Mr. Treadwell contended that Dr. Pusey's article must not be taken to claim that the quality of the X-ray he used for treatment was always the same, but only approximately so; that the doctor doubtless judged of the hardness of the tube by fluoroscopic views of the hand and by the color of the fluorescence of the tube, and that he thus satisfied himself that the quality of the rays did not change markedly during a treatment. All operators have to admit that no accurate and standard method for determining the quality of the X-ray has yet been devised.

In reply, Dr. Pratt stated that no such admissions were hinted in Dr. Pusey's article, in which the amperage and voltage of the primary current was specified as well as the size and make of the induction coil but the kind of X-ray tube and its vacuum were not mentioned. This would give rise to serious blunders if neglected. The vacuum of the tube is the most important agent in determining the quality of X-rays given out. The low amperage claimed as sufficient to satisfactorily operate the coil and tube was declared insufficient by Mr. Scheidel.

Further discussion ensued involving Dr. Pratt's theories concerning the nature of electricity and the X-ray.

Mr. Treadwell argued that electrostatic lines of force, magnetic lines and the X-ray must necessarily be different in nature. For example, each metal has a definite specific resistance to galvanic currents; all substances have a certain permeability to lines of force but though on Dr. Pratt's theory the permeability and specific resistance would have to be of the same order this is not found true at all. The doctor also claims that the X-ray obeys Ohm's law. This cannot be affirmed because the specific resistance is not the same as the relative opacity of the different substances for the X-ray. For instance air, hard rubber, paper and wood, which are non-conductors for galvanic currents are from Dr. Pratt's theory called fairly good conductors for the X-ray as compared with metals which are poor conductors, that is opaque, to the X-ray.

In meeting these objections, Dr. Pratt made a blackboard diagram of a tube and showed how the lines of force, that is the X-rays, proceed from the tube, journey through the air and return to the terminals.

Dr. Grubbe, while not agreeing with Dr. Pratt's theory of the X-ray, thought his criticisms of the article in the Journal very just.

X-RAY FREAKS.

By Prof. T. P. Hall.

(Paper read before the Chicago Electro-Medical Society.)

Pictures made by the Roentgen rays are shadows. Any dense substance placed between the tube (source of the rays) and the sensitive plate checks their action, leaving a lighter spot on the developed plate.

In some cases pieces of metal behind the sensitive plate produce the same effect as they would in front of it.

Dr. H. P. Pratt had noticed such phenomena some years ago. Some weeks ago he exhibited two developed plates, one of celluloid, the other of glass, each bearing a clear imprint of a flat brass spring that was behind the plate during the exposure. In each exposure the plate was in a holder, with woody fiber in front of the plate, and the spring, backed by more woody fiber, behind it. The print of the spring was lighter than the adjacent parts.

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A glass plate was then exposed, film down, with Webster's unabridged and a few small articles on top, and a selection of articles on the oak table below it. The rays all went through the dictionary and the glass before reaching the film, which was protected by three coverings of black paper. The tube had a moderately high vacuum. Its center was fifteen inches above the plate; and the exposure was five minutes, with a fifteen inch coil and a vibrator of the old type.

A 25-cent piece, which was close below the plate, gave a distinct dark imprint. A small file, upon which the quarter rested, produced a light imprint along its whole length. A piece of type metal an inch and a quarter thick, upon which one end of the file rested, showed as a faint light spot with uncertain outline. Another 25-cent piece, which lay on the table beside the type metal, under the file and an inch below it, was faintly visible on the plate. A round-topped glass paper weight half under the plate appeared as a light arc enclosed by a concentric dark arc. A thick piece of boxwood corresponded in a position with an undefined darkening, and a nickel lying on it was distinctly seen as a light circle; but a flat iron key on the other end of the boxwood did not appear at all. A circle of nickeled brass and a cent, lying on the table from a half to one inch below the plate, were faintly visible; while a quarter inch glass tube, an iron wire, a piece of steel a quarter inch in diameter and a half inch high, a paint tube, a pocket knife, a thin tin plate and a pair of eyeglasses left no trace on the plate.

Another plate, of celluloid, was exposed seven minutes, film upward, enclosed in two black paper covers. Above the plate was a plate of vulcanite three sixteenths of an inch thick; and above this, covering parts of it, were pieces of window glass, lead foil and tinfoil folded in several layers. This tube was softer than the former and nothing showed through the tin or lead foil. A paper knife of heavy black wood also lay on top.

All the objects below were arranged so that some part of each was in contact with the lower side of the plate. The glass paper weight, a rubber stopper, a cent and a piece of lead foil were supported on a cushion in a square hole in the top of the table. Of these the lead foil alone appeared on the developed plate as a light imprint, and it was partly over the edge of the hole. Forming one side of this hole was an iron plate; and on an adjacent side a plate of window glass projecting two inches beyond the edge of the oak. This corner (wood and iron) was distinctly visible, the hole appearing lighter. A dime on the iron plate not covered by the glass above made a very dark circle. A nickeled brass paper knife in a similar position left no mark. A dime on a nickeled iron, covered by the upper glass, was distinct and dark; while the iron on which it rested was faint and light. The file, which lay partly on the glass and partly over the hole, did not appear. A 25-cent piece, which lay on the glass over the edge of the wood and was covered partly by glass above and partly by the black paper knife, was very distinct, dark. The part covered by the paper knife was both absolutely and relatively darker than that covered by glass.

Later, on taking a radiograph of a head, Dr. Pratt found that the wires on a frame beyond the plate appeared distinctly at first, but as development proceeded they became very dim.

A number of other exposures have been made, sometimes with no result, sometimes with results similar to those described. The best back-action imprints have been obtained when there was a considerable thickness of material like paper in front of the plate, and wood behind the whole. An exposure of five to ten minutes is required, and a moderately soft tube.

The cause of the phenomena is still obscure. Reflection, direct or diffuse, seems insufficient as an explanation. The possibly existing rays of some other sort produced by the action of the X-rays on the objects do not make matters any clearer. The most probable explanation at present is that there is some sort of backing up of the X-rays, either on Dr. Pratt's view of the X-ray circuit as a sort of electrical circuit, which is affected by resistance in any part of it, or on the theory of longitudinal ether waves. Experiments are still in progress.

SOME PRACTICAL APPLICATIONS OF THE X-RAY IN FRACTURES AND DISLOCATIONS.

By J. A. Rock, M. D.

The X-ray has become a diagnostic agent in all fractures and dislocations. Any work on surgery without full credit to the diagnostic advantage of the X-ray, especially in this branch, would not be an up-to-date book. It is not necessary any more to speak about the value in fractures in honest surgical hands. It is not only valuable in corroborating the discoveries by the usual method of diagnosis, but at times we can discover lesions not recognizable by ordinary methods of examination. It is now an up-to-date diagnostic means within the power of every physician to be his own consultant and quite frequently correct his own mistakes, which would not, perhaps, be recognized until too late. It gives us a correct record of our procedure during the whole care of the treatment and may protect us in every case.

It was found that very early in the history of the X-ray that we had to deal only with the shadows, but by repeating experiments, research and experience, we are now able to photograph not only the shadow of bones, but the substance of the same, and do work that is more successful.

Much has been written about the fallacies of the X-ray, pushing aside the new method of diagnosis;

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but how about the wonderful microscope and ophthalmoscope? You have to look until you see something. To the unpracticed eye, the microscope is much more liable to lead us astray than the very simple application of the X-ray. We had to study to practice medicine; we have to read to manage an individual case of typhoid fever; we have to look up our authorities to operate in a difficult case, etc.; and to manage the X-ray we have to study just as well.

It is very simple, indeed, to turn on the switch and produce the X-ray with the static machine, but it is more difficult to manage the same and to know just what to do in some cases, when the fundamental laws and principles of the electrology and radiology are not well understood. Let me state here that for this reason many mistakes in the beginning of the X-ray phenomena, attributed falsely to the X-ray, instead of the operator himself.

We must know our technique, our Crook's tube and the power of the X-ray; the distance of the tube from the object, which must be as near as possible to the part examined, and the shadows which are seen most beautifully correspond exactly with the radiation from the disk of the platinum in the tube; and make the angle at which the picture is taken. Work must be rapid, exposure short, and the patient well protected. To get a good picture from the X-ray we should know our case, anatomy, and keep the obliqueness of the X-ray in mind and make the skiagraph as nearly life size as possible. Then we will make skiagraphs which will be most wonderful indeed.

The bone relationships in joints, the various movements, direction of dislocation, fissure, depressions, separation of the splinter, the direction of the complete fracture, transverse, oblique, longitudinal, the seat of the fracture, as to the neck, head or shaft, compound or gunshot fracture can all be studied in a striking way with the help of the X-ray, and the different steps in bone development or repair observed. In regard to the callus formation, in many cases the X-ray tells us the truth and will teach us to do honest and successful surgery. When the proper position is known, the X-ray cannot mislead.

You may deceive the sense of touch, but not so easily the eye, which is absolutely unerring in its diagnosis. Some one has said "that in few cases of fracture the X-ray will give no information which we are unable to obtain by any other method, but in a large majority of the cases of fractures we are able, as said, to determine by physical examination the exact condition of affairs just as readily as we are able by means of the X-ray."

Most every surgeon will be surprised at such a statement, knowing that fracture of the styloid occurs in four out of five cases examined for Colles fracture. This condition of affairs never could be made out by cruder methods. In children you cannot recognize the growths of the bones and their exact relationships, if they are altered by disease of trauma, but the X-ray findings are marvelous and correct. If there is a fissure fracture, the X-ray will always show the fissure; but the exact condition might not be made out just as readily by physical examination which gives pain to the patient, with the help of the X-ray a local cranial wound may be much better examined than in the usual way. If fracture exists, it can be readily seen with the fluroscope in five to ten seconds, or a skiagraph may be taken, without any aggravation of pain or any danger of complication to the patient. In impacted fractures the diagnosis is almost impossible in any other way without great danger. The X-ray may also point out when reduction and coaptation can be effected or when an operation should be done.

With the help of the X-ray we will make correct diagnosis through the preliminary dressing, take the same off when the diagnosis is made and reduce the dislocation, apply proper dressing and observe constantly during the whole procedure our work until complete. In a case of fracture, we put the fragment together and apply the splints, and through them carefully observe the results of our work; may change the position of the fragments, if necessary, and apply our final dressing when the fragments are fixed. The dressing need not be changed until necessary, and we may further observe through the dressing the growth of the callus, how the union of the bones is taking place or not, or photograph through a plaster of Paris overcase, after an attempt at reduction, and see if proper approximation of fragments has been accomplished, and find sometimes, perhaps, that the union did not and could not take place. This, under no circumstances, could be made out by other means of diagnosis. Or, if we have a case of suspected fracture or dislocation, or both, where the swelling will not allow any digital examination on account of the pain or the inflammation which masks the true condition, the simple application of the X-ray at once reveals the state of affairs, without any discomfort to the patient and great satisfaction to the surgeon.

"It has been the observation of every railroad surgeon that it is quite impossible sometimes to form a correct estimate of destruction suffered by the tissues and bone, especially in a railroad crush, when the patient is laboring under a great shock or pain." But with the help of the X-ray we may see every particle of the crushed bone through the preliminary dressing and determine if amputation is necessary. Skiagraphs in such cases, taken soon as possible after the accident, and again after first dressing, and again when the patient is discharged from the care of the surgeon, leave the record complete. A skiagraph of a stump may sometimes be also very interesting and useful.

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Such a method of correct diagnosis and the whole procedure in each individual case would be the only just solution of contention between employer and employed. And all this is done without general anesthesia. How often is the operation really of secondary importance as compared with the dangers of anesthesia in such and similar cases? With the facts before each party to the case, clear and unmistakable to both, is it not reasonable to think that litigation would diminish and enmity vanish?

The value of the X-ray in fractures and dislocations, together with all the necessary accessories, cannot be disputed any more. If you wish, the negative will give you the internal structures of the bones with a wonderful depth and perspective, and you will have the picture of the substance, not only the shadow, of which so many surgeons are still afraid. In such cases I use the tungstate of calcium screen over the photographic plate, and get shadows which are both shadow and substance, which, if we do understand them and intelligently interpret them, will always bring us to correct diagnosis.—Oklahoma Medical Journal, December, 1901.

OPERATING UNDER THE X-RAYS.

By J. F. Baldwin, A. M., M. D.

We present the following interesting case as reported by Dr. Baldwin in the Journal of American Medical Association, believing that it will be of use to our readers. The doctor says:

The removal of foreign bodies which have been accurately located by the fluoroscope or skiagraph has come to constitute every-day operations in surgical work. I have not, however, as yet seen any report of a case in which the surgical work itself was done under the light furnished by the X-ray and with the aid of the fluoroscope. Having had one such experience I deem it worthy of presentation to the profession.

George E. R., aged 9 years, was shot July 4, 1899. The bullet was a flobert and entered just above the right patella. The injury seemed to be slight and the wound healed by first intention. Some three weeks later, the joint beginning to give him trouble, an examination was made by his physician, Dr. S. M. Sherman of this city, who thought he detected the bullet under the skin at one side of the patella. He cut down upon the supposed bullet, but found nothing. I saw the case for the first time on July 25, at the office of Dr. Early, an expert radiographer. With the fluoroscope the bullet could be seen with very great distinctness, as the boy lay on his back, on a line with the upper border of the patella and apparently resting on the upper portion of the articular surface of the inner condyle of the femur. It could be seen very distinctly and its removal was apparently a matter of great ease. A skiagraph was made, which verified the view afforded by the fluoroscope.

The bullet, which seemed to be superficial, was located on the opposite side of the patella from that which had been operated on by Dr. Sherman a few days before. The operation wound was suppurating freely. Under an anesthetic. administered by Dr. Sherman, an operation was made for the removal of the bullet July 19. A small incision was first made and enlarged as necessary, but notwithstanding a most thorough search, no bullet could be found.

The only explanation that could be offered of the failure to find the bullet was that it was free in the joint and had simply changed its location during the intervening period. The patient was therefore returned to Dr. Early's office and the fluoroscope again used July 30. This showed the bullet at the back of the joint, but movable; its position could be shifted by rolling the boy upon abdomen. Since it was plain that the position of the bullet varied with changes in the position of the limb, it was evident that unless we wished to open the joint widely the operation must be made with the use of the fluoroscope. Accordingly the preparations were completed the following day.

The bullet was located at the bottom of the joint, the patient lying upon his back. When he was rolled on to the abdomen the bullet dropped down a little, but could not be brought to the dependent portion of the joint. The joint was, therefore, opened through a small lateral incision, and a pair of delicate forceps introduced, hoping to catch the bullet. The operation consisted in an attempt to catch a shadow with a shadow. In order to determine the position of the bullet and also of the point of the forceps, it was necessary to locate them in two planes, and this could only be done by rolling the patient back and forth from back to side, so as to get two views. With great difficulty the bullet was finally grasped, when it was found to be impossible to withdraw the forceps with the bullet in its grasp owing to the approximation of the articular surfaces. The bullet was therefore pushed up to the opposite side of the joint and extracted through a minute counter opening.

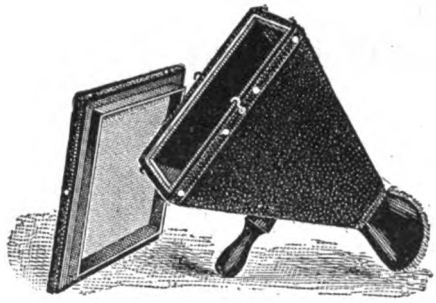
All things considered, I never performed a more difficult operation. The room was necessarily dark, the day was hot, and the noise of the machine was almost intolerable, while the fear of infection from the suppurating wound, which was in close proximity to my own incisions, was constantly before me.

Fortunately, although there was some inflammatory exudate present in the joint at the time of operating, there was no infection from the outside. The incision was closed carefully without drainage, a splint applied to secure fixation, and recovery was entirely uneventful, the ultimate motion of the joint being perfect.

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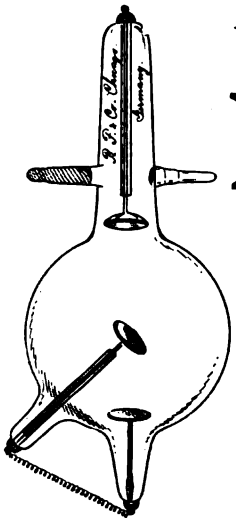
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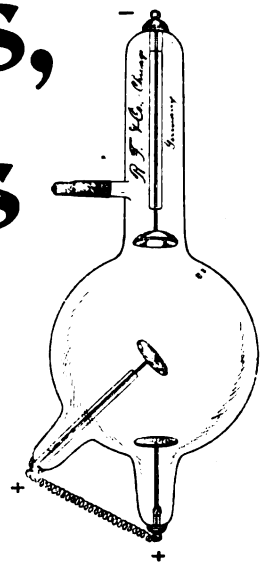
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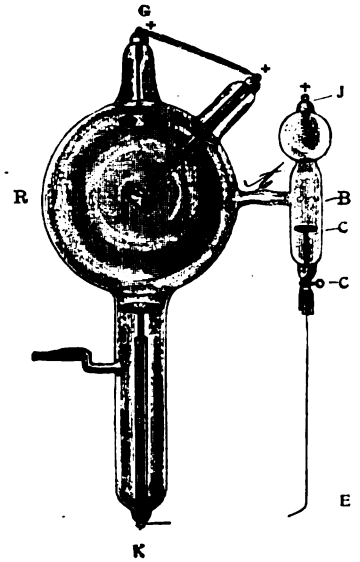
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DR. J. O. M. HEWITT, - - - - Editor.
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NOTICE.

The January meeting of the Chicago Electro-Medical Society will be held at room 1302 Champlain building, corner State and Madison streets, Tuesday evening, January 28, at 8 o'clock p. m.

ELECTRO-THERAPEUTICS.

At no time has any practice of medicinal art been so alive to the scientific world as it is at present, for every day some new discovery of science in relation to living organism forces itself upon the attention of the physician, who is ever alert to know what he can of the human body, both in its abnormal and its normal states, so that he may successfully combat disease. In this new era of investigation the microscope has had its just place of honor, revealing as it does the hitherto invisible workings of the human system; and the chemist has busied himself with toxicants and anti-toxicants that may, rightly used, control the action of "the mighty hordes innumerable" that have in the body of us their home and their activities. But what school of the past could undertake to tell what was the real force or energy of life action? True, electro-therapeutics is not a newly born child of the therapeutic family, but still we know that even now the medical world of the older schools of thought is loath to give it a fraternal recognition, treating it as a bastard among sons, that may be at times useful, but never to be called "one of the family"; and as such entitled to all the honors and emoluments thereof. But to-day this child of fortune, hitherto despised, seems to be coming into its estate, and not only that, it is beginning to assert dominion. On the last day of 1901 Dr. Loeb of Chicago University asserts that electricity is the vital power of all cell life, and the natural inference from such deduction must be that electro-therapeutics is the true theory of study for the physician, relegating the older theories to the place of servants that the rightful king might reign.

Professor Loeb's paper was on the subject "Physical Effects of Electrical Charge of Ions and the Electrical Character of Life Phenomenon." Professor Loeb says in his paper:

"Parthenogenesis has been interesting to me only to learn how the electric charges of ions affect life phenomena. The energy of foodstuffs and the motions of the heart are not, after all, due to the production of heat, but to the chemical energy in electrically charged molecules. A part of the chemical energy of foodstuffs is changed into electric energy which moves the body. Rhythmical contraction of muscles comes only in the presence of electrically charged substances. The efficiency of the action depends upon the number of charges of different ions. Pure salt is always poison because either the positive or negative substances predominate. Electricity neutralizes this effect of the salt solution. A muscle is stimulated by electro-negative charged particles, while electro-positive charged particles have an opposite effect."

In his study slowly but surely the professor has been drawing nearer and nearer to a clear insight into the vital processes of living organisms. He says:

"The human organism is made up of ions or electrically charged atoms, or groups of atoms, in solution. If it were possible to introduce in the body these electrically charged molecules we should be able to modify the qualities of the tissues. The body becomes overcharged with ions, which are toxic, or poisonous, in their effect. Now, by introducing ions of an opposite character we should be able to overcome the bad effect of the former."

Following Dr. Loeb, and corroborating him, Professor Mathews sought to show that what he had said of the tissues held good for nerve cells. Professor Mathew's word may be summed up as follows:

1. Motor nerves contain or consist of a colloidal

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solution, of which the colloidal particles carry positive electrical charges.

2. Nerves are stimulated by the passage of the colloidal particles from a condition of a solution to that of gelation.

3. This change is brought about by the action of electrically charged atoms which bear negative charges. The stimulating action of any compound depends on these negative charges.

When the negative charges are set free by the colloidal particles being forced together they precipitate the next layer of colloids, which in turn set free negative charges. This precipitates the next layer and in this way the nerve impulse is carried.

If these things are so, and we believe they are, then those words of Dr. Neiswanger before the Chicago Electro-Medical Society at a late meeting, that "there is no disease of the human system but that can be made to yield by the proper use of electricity," are words of true wisdom, not of fanaticism or of ill-timed enthusiasm. If it is true, as we have long contended, that we owe to electricity, to electric action, all that there is of form in the visible universe, then it must follow that by electric methods must be mended all the disease of formation. True, we may by compounds, medicines, excite these needed repolarizations of the various parts of the body, but how much better if we can, by direct application of the electric energies, do the work?

Creation and recreation—are they not parts in the method of the universal whole? And the nearer we get to nature the more successful will be our work as physicians.

In regard to artificial reproduction, a subject with which Dr. Loeb has experimented for a long time with the most satisfactory results, he said that all his experiments had been conducted in order to discover whether electrically charged atoms worked in the same way in regard to division of cells, rhythm of muscular contraction and nerve impulses, and he found that they did; and this but substantiates our position, for the power that creates is surely the power to regulate! "The time is coming, and now is," when electro-therapeutics in the various forms of galvanic, static and X-ray work will be the commanding pathology of the world.

In the discussion of the paper by Professor Loeb scientists present were warm in their congratulations to him and his associates in the work done. Professor G. N. Stewart of Western Reserve University said:

"This is a look into the mechanics of living tissue which we have never had before. Dr. Loeb has brought to the front the subject of electro-physiology heretofore despised."

"This work opens a new heaven and a new earth in physiology," declared Professor Mathews of the University of Chicago. Dr. Martin Fischer, another scientist, said:

"This practically changes the entire basis of physiological text-books, which will have to be in great measure rewritten."

We note with pleasure that this conclusion of Professor Loeb, though arrived at upon entirely different lines of study, corresponds with the views of Dr. H. P. Pratt, as published by him some five years ago; not that we consider that the matter is fully settled, but these varied experiments by the scientists of world-wide prominence all seem to be pointing in one direction, and almost compel us to recognize as a fact that electro-therapeutics has the lead in real scientific work among the many schools of therapeutic practice.

MEDICAL JOURNALS.

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CAREFUL SCIENTIFIC OPERATORS NECESSARY IN THE USE OF THE X-RAYS.

In the Critique for October we find some very pertinent suggestions upon this subject from the pen of James W. Ward, which we present to our readers as worthy of consideration. He says:

The reliable diagnosis or exclusion of rental and ureteral calculi furnished by the improvement in X-ray technique, and the complete operation with the kidney under control, has placed nephrolithotomy in a position where it rivals in accuracy of diagnosis and safety of procedure the old lateral lithotomy the brilliant operation of our student days, the mortality in each being about 3 per cent in the hands of the expert.

Skiagraphy of biliary calculi in the hands of Dr. Carl Beck has been productive of definite results. The patient should be in the abdominal position, the pencil or X-rays sent obliquely so as to invade the smallest amount of tissue. The field has been carefully covered by Prof. J. W. White, as to the medico-legal relations of the Roentgen rays. I quote:

"1. The routine employment of the X-ray in cases of fracture is not at present of sufficient definite advantage to justify the teaching that it should be used in every case. If the surgeon is in doubt as to his diagnosis, he should make use of this, as of every other available means, to add to his knowledge of the case, but even then he should not forget the grave possibilities of misinterpretation. There is evidence that in competent hands plates may be made that will fail to reveal the presence of existing fractures, or will appear to show a fracture that does not exist.

"2. In the region of the base of the skull, the spine, the pelvis and the hips, the X-ray results have not been as yet thoroughly satisfactory, although the skiagraphs have been made of lesions in the last three

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localities. On account of the rarity of such skiagraphs of these parts, special precaution should be observed, when they are affected, in basing upon X-ray testimony any important diagnosis or line of treatment.

"3. As to the question of deformity, skiagraphs alone, without expert surgical interpretation, are generally useless and frequently misleading. The appearance of deformity may be produced in any normal bone, and existing deformity may be grossly exaggerated.

"4. It is not possible to distinguish after recent fractures between cases in which perfectly satisfactory callus has formed and cases which will go on to non-union. Neither can fibrous union be distinguished from union by callus in which the lime salts have not yet been deposited. There is abundant evidence to show that the use of the X-ray in these cases should be regarded as merely an auxiliary to other surgical methods, and that its testimony is especially fallible.

"5. The evidence as to X-ray burns seems to show that in the majority of cases they are easily and certainly preventable. The essential cause is still a matter of dispute. It seems not unlikely, when the strange susceptibilities due to idiosyncrasy are remembered, that, in a small number of cases, it may make a given individual especially liable to this form of injury.

"6. In the recognition of foreign bodies the skiagraph is of the very greatest value; in their localization it has occasionally failed.. The mistakes recorded in the former case should have been easily avoided; in the latter they are becoming less and less frequent, and by the employment of accurate mathematical methods can, probably, in time be eliminated. In the meantime, however, the surgeon who bases an important operation on the localization of a foreign body buried in the tissues, should remember the possibility of error that still exists.

"7. It has not seemed worth while to attempt a review of the situation from the strictly legal standpoint. It would vary in different states, and with different judges to interpret the law. The evidence shows, however, that in many cases, and under many differing circumstances, the skiagraph will undoubtedly be a factor in medico-legal cases.

"8. The technicalities of its production, the manipulations of the apparatus, etc., are already in the hands of the specialists, and with that subject, also, it has not seemed worth while to deal. But it is earnestly recommended that the surgeon should so familiarize himself with the appearance of the skiagraphs, with their distortions, with the relative values of their shadows and outlines, as to be himself the judge of their teachings and not depend upon the interpretations of others who may lack the wide experience with surgical injury and disease necessary for the correct reading of these pictures."

Conclusion.

I am impressed that the future triumphs of surgery will depend greatly upon improved technique, profounder studies in pathology, and especially upon the nearer scientific association of the physician who sees, diagnoses, prescribes, decides and the surgeon who is the final arbiter and the possessor of the special skill required.

We cannot divorce medicine from surgery without impairing the clinical result of the latter. Let every student in our medical colleges study anatomy and materia medica every day of every year throughout his college life, then there will be eliminated that great danger of modern surgery which is becoming more apparent every day, the tendency to operate hastily, and even unnecessarily, owing to the ease with which operations may now be safely performed. The growing custom of associating the physician and surgeon in the treatment of many cases in which operative intervention may be required is, therefore, a step in the right direction and brightens the dawn of the glad day to larger and greater success.—James W. Ward, M. D., in Pacific Coast Journal of Homeopathy.

SKIAGRAPHY IN ORTHOPEDIES.

At the October meeting of the New York Academy of Medicine Dr. Weigel read a paper upon the above subject that we here present to our readers, illustrating his discourse with many negatives adjusted in the X-ray stereoscope which he used. A brief reference was made to the technique of stereoscopic skiagraphy, and the advantages over the ordinary method of producing X-ray negatives were fully explained. The technique was not difficult. He considered one of the principal difficulties in skiagraphy—the proper interpretation of the negative in the stereoscope. The idea of depth was given which was not apparent when viewing the negative alone. By reversing the negatives in the apparatus the pictures could be viewed from the opposite surface.—Medical Times and Register.

X-RAY IN CASES OF SUPPOSED FRACTURE.

A. L. Mader, M. D., has in "Maritime Medical News" a well-written and exhaustive article upon treatment of fractures, and in it uses these words: "I hope the Roentgen rays in these later days, by diagnosing obscure longitudinal fractures, which are generally treated as sprains, will not cause disability to the same extent as under other or common methods of diagnosis," thus adding his testimony to the long list of eminent physicians and surgeons, to the value of the X-rays in all that pertains to this comparatively new method.

In this connection we would say that the Maritime Medical News of Halifax, N. S., is a welcome visitor to our table, and is well filled with able matter.

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SECRETARY'S REPORT.

The December meeting of the Chicago Electro-Medical Society was held on Monday evening, December 30, at room 1302 Champlain building, corner of State and Madison streets, Chicago.

Meeting called to order at 8:15 p. m., President Burdick in the chair. Owing to the temporary absence of the secretary, the reading of the minutes was postponed. On motion, the constitution was amended, giving associate members all the privileges of the society, except that of holding elective offices.

The society then proceeded to the reading of the papers of the evening and their discussion. The first in order, by Dr. H. P. Pratt, entitled "Some criticisms of a paper by Dr. Pusey as published in the American X-Ray Journal." Paper discussed by Dr. Burdick, Messrs. Friedlander, Treadwell and Scheidel. The next paper was by Dr. T. P. Hall, entitled "Some X-Ray Freaks," and was discussed by Drs. Pratt, Burdick and Prof. Treadwell.

Dr. H. P. Pratt proposed W. A. Pratt, M. D., as a member of this society. Name was referred to membership committee.

The secretary being present, the minutes of the last meeting were read and approved. Dr. H. P. Pratt presented the case of a physician where a jury gave damages in favor of the plaintiff patient, basing their verdict upon a radiograph taken by a non-professional operator. The matter was referred to a committee consisting of Messrs. Friedlander, Treadwell and Hall. The following committees were appointed by the chair: Membership—Drs. A. H. Baer, C. S. Neiswanger, W. R. Burch. Auditing—A. B. Slater, R. S. Gregg, J. O. M. Hewitt. Publication—R. Friedlander, Drs. S. V. Clevenger and R. H. Street. Scientific Research—Drs. H. P. Pratt, T. P. Hall, Prof. C. H. Treadwell. Executive—R. Friedlander, Drs. J. E. Gilman, H. P. Pratt. On motion, "Publicity" was named the subject for discussion at the next meeting. Visitor present: Ethel Heard, M. D., of Minneapolis. Meeting adjourned. Time, five minutes after 10 o'clock, Monday evening, December 30, 1901.

RICHARD H. STREET, Sec.

WHAT IS THE ACTION OF A COIL INSERTED IN THE CIRCUIT OF A GALVANIC BATTERY?

Dr. W. R. D. Blackwood says (Nov. No. Medical Summary): "I have been asked what is the action of a coil inserted in the circuit of a galvanic battery?

"My answer is: The action is to introduce 'resistance,' which destroys the value of the current in proportion to the length of the wire forming the coil. By Ohm's law we find that the amperage is reduced by resistance, and consequently we lose just so much galvanic action. Ohm's law is, The quantity of electricity passing through a given point in a circuit varies directly as the electro-motive force, and inversely as the resistance.

"Second, 'What is the use of a faradic coil introduced in a galvanic circuit?'

"My answer is: It is a question of personal taste. Long ago electro-therapeutists who have much experience learned that combined galvanic and faradic currents were of little value at any time, and contradictory generally. The so-called 'high-tension' coil is a misnomer, for tension was some years ago meant what we now term 'voltage,' and pressure is not increased by coil winding. The long wound coils simply add great resistance to the passage of the current; hence the pretended soothing effect, which is simply due to very little electricity passing through the patient. A strong current irritates; a weak one does not.

"Voltage is increased by adding cells to the primary circuit—each cell having about one to one and a quarter volts—the amperage is not increased by this addition. A cell as small as a thimble has the same amperage as one as big as a barrel, but the big one lasts longer before being worn out. Electropoion cells are dirty and have been discarded long ago by those who value time, cleanliness and good results. The addition of sulphate of magnesia or any other salt destroys the value of the chromic acid which is the factor in electropoion fluid. Polarization cannot be prevented; it comes from the hydrogen being deposited on the distributing electrodes. The battery soon recovers itself.

"Third, the action of a coil interpolated in a galvanic circuit is to produce condensation, just as the spark coil does in gas-lighting apparatus. We have several forms of condensers, the usual one in Rhumkorff's or Ritchie's being the 'plate,' which is a long layer of tinfoil placed between layers of oiled silk, and located beneath the coil itself in the base. The 'rolled' condenser is much the same in telephones for long distance, the form being circular to save space. The capacity of a condenser is usually about 2+ Microfarads.

"Faradic machines produce an interrupted alternating current, the alternations being, of course, equivalent to a circuit-breaker producing interruptions. The current is 'to and fro'; at the 'make' it is from left to right through the conductors from the secondary, and the reverse at the 'break.' In the 'break' we get the so-called 'extra current,' due to self-induction from the superimposed coil layers, and the spark at the rheotome is a direct loss of energy. Faradic machines may be so fixed as to give a direct flow, but this is of doubtful value in medicine. The price is prohibitory. Mine cost me two hundred and twenty-five dollars. A good machine for ordinary use by physicians can be had at fifteen to thirty dollars. My direct arrangement has double commutators which switch every second pulsation into individual circuits, and as the alternations are somewhat above forty thousand per minute each collector gets twenty thousand—far beyond the ability

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of the muscles or nerves to recognize. I use either or both on the same patient, or sometimes on two different ones at the sitting.

"In electro-therapeutics we simply require galvanism, and interrupters, reversers and such attachments are seldom needed. My own switchboard is very complicated, and it has lots of electro-magnetic and manual contraptions, but they are for use in commercial work, such as testing and experimentation, which relieves me from visits at times to the power houses. As to faradism, we need simply a good coil, and the practice of combining the two currents is of doubtful utility, as said above. I seldom use the sinusoidal apparatus, and also do not do much with the static now, except in minor nervous troubles. Simplicity is the sine qua non in medicine; too much twaddle has been written about medical electricity. I have more than two hundred books on the subject, and all the cream of them can be put into fifty pages instead of the twenty thousand leaves of the volumes.

"I have treated three cases successfully of tetanus, which is somewhat akin to the spasms of hydrophobia, if there is such a disease, and I used galvanism alone, of course, for we then need sedation. Faradism would aggravate the trouble, as that current is a cerebro-spinal stimulant. Inverse currents sedate; direct act oppositely in galvanism. Controllers which act as 'sliders' are the only proper ones in medicine, all posts which jump from button to button produce more or less shock at each addition or subtraction. The graphite rheostat is a good example of a sliding controller. The entire battery is between the terminals, and the current is therefore regulated by the controller alone.

"My galvanic plant is of two hundred and fifty cells of Leclanche, in sections of a hundred each, with one of fifty. This cell runs at full load for ninety minutes with about 7 per cent in polarization, which is abrogated by additional cells as required, and the battery renews its strength in about twelve minutes to par. For heavy work I use the storage or secondaries. The accumulators are of the chloride type, and I keep them in circuit always with the improved callauds, thus having them at all times up to high energy.

"Electricity is a very big thing in medicine."

We quote the above not only that it deals with the question in an able manner, but because it is one more evidence that electro-therapeutics is obtaining constantly a firmer hold upon consideration of the profession, who in the past have not thought it to be much more than a means of attracting a patient's mind away from his "aches and pains," and so producing a psychic effect, rather than as a real curative as well as creating agent in the great universe of life. We know that it is the last view that is the correct one, and yet we do not deny that it may be at times the other; but eventually all must recognize it as "the one" powerful means of health.

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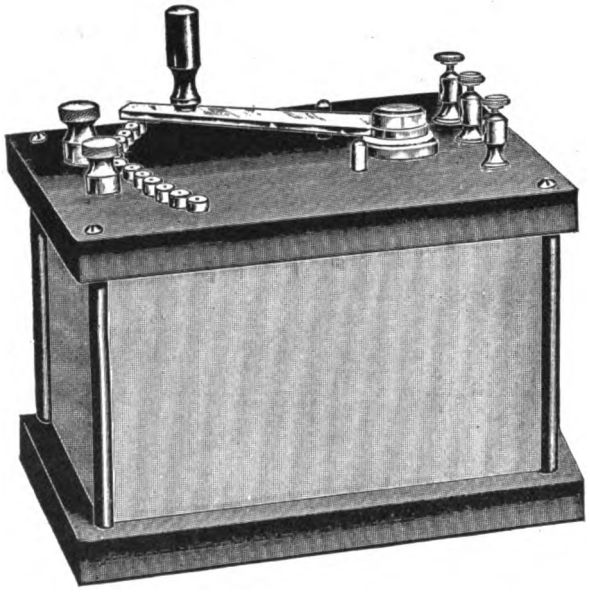
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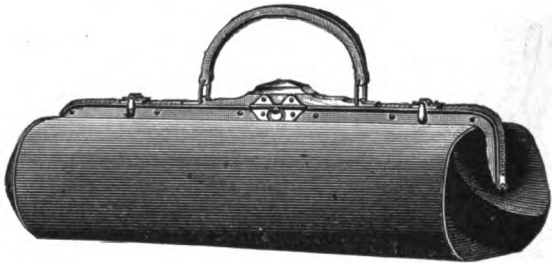
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AMERICAN ELECTRO-THERAPEUTIC



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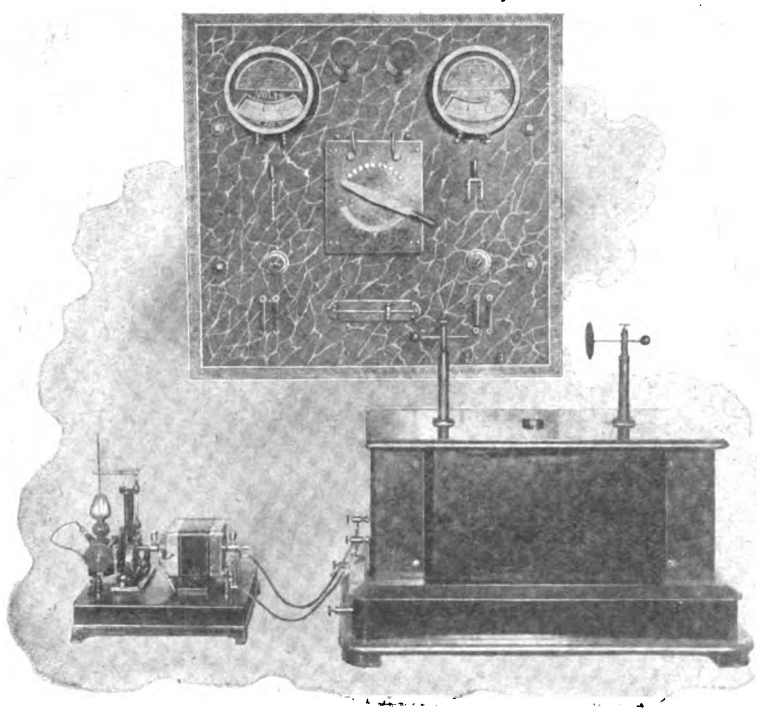
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Electro-Therapeutic and X-Ray Era

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VOL. II. CHICAGO, FEBRUARY, 1902. No. 2.

"UNEXPECTED RADIATIONS IN X-RAY WORK."

By Prof. P. Kropotkin.

(Nineteenth Century, December Number, 1900.)

The sensation created in 1895 by the discovery of the X-rays had hardly begun to subside and the patient, minute exploration of the newly opened field was only just beginning, when new discoveries of formerly unexpected radiations came to add to the already great complexity of the phenomena, upsetting the provisional generalizations, raising new problems and preparing the mind for further discoveries of a still more puzzling character. At the present time the physicist has to account for not only the Kathode and the X-rays, but also for the secondary or "S-rays" of Sagnac, the "Goldstine" ray, the Becquerl rays, and, in fact, for all the radiations belonging to that immense borderland between electricity and light. The "vacuum tube" is the starting point for all new radiations, and in its simplest form has at each end a piece of platinum wire passed through the glass and entering the tube. When these two wires are connected with the two poles of an induction coil, or the electrodes of an electrical machine, or a powerful battery, they become poles themselves.

The tube begins to glow with a beautiful light, and a stream of luminous matter flows from its negative pole (K) to the positive pole (A). These are "the Kathode rays." Now if such a tube be placed inside a black cardboard muff, which intercepts its light, and if it be brought into a dark room near to a screen painted with some phosphorescent substance, this substance begins to glow, although no visible light is falling upon it. If a wire be placed between the tube and the screen, its shadow appears on the screen, and if the hand be placed instead of the wire, dark shadows of the bones, with lighter of the flesh, are projected. Some radiations proceeding along straight lines must consequently issue from the tube. Like light, they make the phosphorescent screen glow, move in straight lines and decompose the salts of the photographic film; but they are invisible and pass through such bodies as are opaque for ordinary light. These are the X-rays. Various secondary rays originate from them. If the X-rays meet a metallic mirror, they are not reflected by it, but simply diffused; and though they do not pass through metals as a rule, they may be made strong enough to pass through thin metalic plates. But in both cases they will acquire some new properties which will depend upon the metal which has diffused them, or through which they have passed.

Some new radiations will be added to them and these radiations were named "secondary rays," or "S-rays," by M. Sagnac, who discovered them. On the other hand, if the Kathode rays have been passed through a perforated metalic plate, they also get altered, and in this case they will be sometimes named "Goldstine rays." And, finally, there is a very wide set of extremely interesting (also invisible) radiations emitted by phosphorescent substances. These are named "Becqueral rays," or "Uranium rays." This is, then, the world of radiations, the very existence of which was mostly unsuspected a half dozen years ago, and which have to be explained—the difficulty being in that they link together the "Hertzian waves," which are now used for wireless telegraphy, the visible light waves, the invisible radiations in the ultra-red and the ultra-violet parts of the spectrum, to so-called "activic" glow of various substances placed in the violet portion of the spectrum and various other phenomena. Upon one point only a certain consensus of opinion begins to be established—namely, as to the Kathode rays. Most explorers, including Lenard, begin to be won to the idea that the Kathode rays are the paths of very minute particles of matter which are thrown at a very great speed from the surface of the Kathode, and are loaded with electricity. Even under ordinary conditions, when an electric discharge takes place between one metallic electrode and the other, under ordinary atmospheric pressure in a room, we see that most minute particles of the metal are torn off the negative electrode (K) and are transported in the electric spark. Molecules of air join in the stream, creating the well-known "electric wind," and the air path of the electric spark becomes electrified to some extent—the more so when the discharge takes place in the extremely rarified medium of a vacuum tube, and we see them as a cone of light.

The Kathode rays are real streams of matter. They act as a real molecular or atomic bombardment, and they heat the objects they fall upon. They are deflected from their straight path by a magnet, and are twisted along the lines of force. Besides, a weak electro-static force has upon them the same effect, showing that they are electrified negatively. Perrin and others who followed him proved that these rays carry negative electricity with them. Negative electricity cannot be separated from them; it follows with

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them when they are deflected by a magnet; it is their property, not something added to them.

It must be said in favor of this hypothesis that dissociation under the action of violent electrical vibrations—i. e., the breaking up of molecules into ions, or elementary atoms carrying electricity with them—is familiar to physicists.

The philosophic value of this new move in electrodynamics, the value of the principle of action being introduced into the theories of vibration of the formerly "immaterial" ether, is immense and is sure to bear fruit in natural philosophy altogether. Ether itself, after having resisted so long all attempts to seize its true character, becomes dissociated matter, filling space and upsetting many an old, previously conceived idea.

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The Becquerel radiations also consist of material particles projected from the radio-active bodies and carrying electricity with them. The "emanations" from thorium compounds are even affected by draughts in the room. But these emanations are neither dust nor vapors. They must be atoms or ions of the radiating body, and they communicate radio-activity, and consequently the power of discharging electricity to the surface of the bodies with which they come in contact.

This paper by Prof. Kropotkin, from which these extracts have been made, seems to add another testimony upon the side of "the growing opinion" among scientists that to electricity belongs the potency of the X-rays. And, too, does it not strengthen the cause of electro-therapeutics? The X-rayist is not dealing with a new potential, but with a new method of using what the electro-therapeutist believes to be the one great potential of the universe.

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He knew of several surgeons not at all opposed to the X-ray even as a therapeutic agent, though they felt its value had not been thoroughly tested as yet. He believed that the medical profession would soon cease to send patients to outsiders for radiographs when their work is now surpassed by members of the profession. The outsiders were perhaps the first to take fine pictures.

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The points of especial interest in this case were the anesthesia of the affected skin, and the length of time that elapsed before the inflammatory process was apparent on the external surface. As there is no other way to account for this attack of dermatitis, it is reasonable to believe that it resulted from the exposure to the X-rays.

This must have injured the sensory nerve terminals, producing a localized anesthesia, so that the electrolysis of the deeper portion of the skin was followed by a slow inflammatory process, which escaped observation until the papular eruption showed itself.

It seems to be a common opinion among medical men that dermatitis occasionally following the application of the X-rays is due to some irritating or poisonous property of the rays themselves, but this view is not generally held by electricians and physicists. In an article by Tesla on the subject he suggests four possible causes of injury during exposure to the X-rays:

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action will cause similar, if not identical, injuries, under conditions not productive of X-rays. (2) It is pretty well established that the intensity of X-ray energy is inversely as the square of distance from the source, while the power of the injurious agent does not appear to act according to such a law. (3) Tesla finds the liability to injury nearly or quite excluded by covering the exposed skin with a fluid (oil or vaseline), which will exclude the contact of air, while at the same time it is very transparent to the X-rays. (4) Again, Tesla finds that all danger of injury, even within sixteen inches of the extraordinary highly excited tubes which he uses, is removed by placing a thin screen of sheet or gauze aluminum between the tube and the person, the screen being well earthed. (5) The worst spots in these injuries sometimes are in places which the X-ray could not have reached.

So far as a conclusion may be drawn from the studies and observations reported, it seems probable that the injury is due in some way to the rapidly alternating high potential electrostatic action; yet, on the other hand, this rapid and great change of electrical state may kill tissues by some other than electrolytic action.—Medical News, July, 1897.

CASES OF FRACTURE OF THE ASTRAGALUS WITH SKIAGRAPHS.

We present below extracts from a paper read by Dr. Geo. R. Fowler before the Brooklyn Surgical Society under the above title, believing that it will be of interest to our readers. Also a paper by J. S. Wright, Jr., B. S., M. D.:

Dr. Geo. R. Fowler presented a little boy, four years of age, who had been admitted to the Brooklyn Hospital October 22, 1900, with the following history: Three months before, while playing about his mother's sleeping room, the marble top of a large bureau, which was resting against the wall, fell upon his foot. Examination showed a dislocation outward of the entire foot below the level of the dorsal surface of the scaphoid, with the exception of a bony mass, which could be felt beneath and behind the inner malleolus.

Skiagraphic pictures taken of the foot by Dr. H. P. Bender of this city showed the lesion very clearly. It is that of a fracture of the astragalus, the entire articulating surface being broken off at the neck and pushed, according to the skiagraph taken laterally, apparently directly backward.

A skiagraph taken from behind showed that the broken off portion of the astragalus had been displaced under the tibial malleolus, and in order to show clearly the relation of the fractured portion to the remainder of the astragalus a skiagraph was taken representing a view from in front, of both the normal foot and the injured foot. The astragalus of the normal foot was clearly shown at the tibio-astragaloid articulation, while the displaced articular surface of the head of the astragalus forced under the tibial malleolus was very well shown in the skiagraph of the injured foot.

About three weeks ago this patient was submitted to the following operation: A curved incision was made directly over the displaced fractured portion of the head of the astragalus and likewise embracing the tibial malleolus in its area, and a flap turned almost directly upward. This flap exposed the displaced fragment and the malleolus of the tibia as well. The portion of the astragalus removed represented the entire head. It was found broken off just at the neck, and the articulating surface corresponding to the tibia, as well as the lateral articulating surface corresponding with the fibula, appeared upon the fragment.

Very little difficulty was experienced in the removal of the fragment, although some adventitious tissue was present as the result of nature's effort to accommodate the fractured bone to the new environment; but there was absolutely no attempt at union between this displaced portion and the neck of the astragalus.

The patient was presented. He had made a good recovery. The foot as shown was in marked contrast with the condition as exhibited in the photograph first shown. There was a fair amount of motion in the ankle joint, although there had been no attempt made to bring this about; in fact, the bandages had not been removed except for purposes of redressing until to-night. Dr. Fowler presumed that actual measurement would show a difference in the space between the level of the malleoli and the sole of the foot, but without taking into account this point, there is very little difference to be seen between the two feet.

In examining the skiagraph taken laterally it could be noted that the posterior displacement of the fragment was shown, with an apparent tension upon the tendo Achillis, the fragment encroaching as it were upon the fat cushion placed in front of the latter, and between it and the posterior surface of the astragalus. The fragment was definitely made out in this position before the X-ray exposure.

All of the astragalus which articulates with the tibia and fibula and with the calcaneum was removed. Only the portion which articulates with the scaphoid was left.

In the second case reported by Dr. Fowler the man was crossing in front of a moving trolley car, and, according to his statement, his left foot was forward and out of the way; the fender of the car struck the right foot upon the inner side.

It is important in all of these cases of fracture of the astragalus to determine the direction of the force, since it was formerly supposed that the great majority, if not all the cases of fracture of the astragalus oc-

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curred from the patient falling from a height, the fractured portion, where displacement occurs, being forced out from between the tibia above and the calcaneum below by a sudden crushing impact.

This second case of fracture of the astragalus occurred in all probability in a manner not unlike the one first described, except that the blow in the one was received upon the outer side of the foot, while in the other it was received upon the inner side.

In this case the removal of the fragment herewith presented was accomplished on the tenth day after the accident. The operation was too recent to permit presentation of the patient. The fracture as shown by the skiagraph, and confirmed at the operation, was almost vertical. There was here a very clear history of the foot being sharply struck almost upon the same plane as that upon which the foot rested, yet here is a fracture vertical in direction and which does not involve the neck of the astragalus at all, but simply the outer articulating portion of the bone; there is present distinctly marked, the facet which articulates with the fibula, together with the portion of the superior surface articulating with the tibia; and last, the inferior articulating surface where the bone plays upon the calcaneum.

These cases were interesting to the speaker's mind because of the manner in which the blow was received; the fragment was displaced in the direction in which the force would naturally carry in both instances. The Roentgen ray is opening up a large field of diagnosis and increasing the field of operative work as well, and in the future will probably be the cause for most of the chapters on fractures and dislocations, particularly those in the neighborhood of the joints, to be entirely rewritten.

Discussion.

Dr. Walter C. Wood said that some years ago when he had the pleasure of assisting Dr. Fowler, he had done this same operation on a boy whom the speaker saw some years after the removal of the astragalus, and the functional result was practically perfect.

These cases of Dr. Fowler's are interesting in several ways; first, from the pictures that have been shown and the interpretations that could be made from such representations. Dr. Wood had read recently the report of the Medico-Legal X-Ray Committee of the American Surgical Association. It was a report, he thought, we all should study with care. Without going into the matter, the general drift of that report is that while the X-ray is a benefit to a skilled surgeon in interpreting the results, it is not at present sufficiently accurate and is often so misleading that, from the medico-legal aspect, it has many things to be desired and practically should, in many cases, be kept out of the hands of the jury. In other words, the general statement made in regard to its reliability did not carry out completely the efficacy of the shadowgraphs as would be inferred from Dr. Fowler's remarks to-night; but that report is distinctly from the medico-legal aspect and not as an aid to diagnosis on the part of the surgeon.—Brooklyn Medical Journal.

ELECTRO-THERAPEUTICS IN CONSUMPTION.

Experiments are being made on a most elaborate scale in London with a modification of Tesla's high-frequency electrical current in the treatment of consumption. It is stated that some remarkable results have been achieved.

These experiments, for the most part, have been conducted by Dr. T. J. Bokenham, an eminent West End surgeon, in his private practice, but with the knowledge and approval of the leading consumption specialists. For various reasons, but principally because of evil results which might accrue if the system were used by any but the most experienced medical men, with a perfect knowledge of the forces they were dealing with, the experiments have been quietly conducted. Applications for details of the methods used have not been encouraged.

Dr. Bokenham has had fitted up a most elaborate apparatus for the production of electricity in the particular form in which it is used, the net result of which is that a current of 80,000 volts is produced, of such high frequency and administered in such small quantities that the consumptive patient may receive it without the slightest injury. The awe-inspiring force of this voltage may be best appreciated when it is remembered that only 500 volts are employed for driving trains on a railway. Yet the patient is not conscious of the enormous electrical pressure.

By one method of this treatment the patient is laid in a reclining position on a chair. The chest is laid bare, or partially bare. The back of the chair is insulated. Thus, when the patient receives the current from the electrical machine, a complete electrical circuit is established through the floor.

The current is applied from an electrical brush, held a few inches from the body. When the apparatus is set working electricity is discharged from the end of the brush with a loud cracking noise, there is a faint smell as of ozone, and a number of lines of electrical blue fire appear. Thus is the current passed through the chest, a slight warmth only being experienced by the person receiving it.

This is the monopolar method. By the other method, the one which Dr. Bokenham is inclined to favor, the patient, in the same posture as before, simply takes hold of a handle like that of an ordinary galvanic battery and receive the 80,000 volts till he is what is described as supersaturated with electricity. He feels nothing whatever, but if the attendant touches his skin sparks fly out in all directions. When he is using this treatment Dr. Bokenham purposely applies his

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finger to the most affected parts of the patient's chest, thus concentrating the electricity there for the time being.

With both systems the application lasts from ten to fifteen minutes at a time. The treatment is undergone three or four times a week or daily. The first result is on each occasion that there is a pronounced rise in the patient's temperature. Usually it rises two or three degrees, but in at least one case the rise amounted to as much as six degrees.

The precise nature of the physical effect is a matter of some uncertainty at present, but the improvement in the patient in some respects is beyond all doubt. Dr. Bokenham's experience is that in very bad cases of consumption the cough has been greatly reduced, night sweats have disappeared, the appetite has improved and there have been a great gain in weight and general health. So that even if the consumption bacilli have not been destroyed it is certain that their virulence has been much decreased, that they have been brought under control and that the patient has felt cured.

A doubt entertained by phthisis specialists who do not question these temporary improvements is whether it is anything more than a mere exhibition. Dr. Bokenham, however, has great faith in the future of the system. In one case a remarkable result has been effected by it. A gentleman, after every sort of treatment, was to all appearances in the last stages of consumption. It was said he had no healthy lung tissue left to breathe with. His business had been abandoned. For a long period he had practically been confined to his room. He received the electrical treatment daily. To all appearances he has recovered and has resumed his professional work.

The questions now to be solved are as to the precise effect upon the bacillus tuberculosis of the 80,000 volts and whether the effect is in any way permanent.—Press Dispatches.

SUCCESSFUL PHOTOTHERAPY.

The recent award to Professor Finsen, of Copenhagen, of one of the magnificent Nobel prizes (its value is over $50,000), established by the will of the great Danish manufacturer of dynamite, recalls the attention of the medical world to Finsen's successful researches in the domain of light therapeutics. It is fortunate, for in the multitude of claims on medical attention sometimes the really good things are for a time at least crowded out of sight. Professor Finsen's work, accomplished with patient scientific carefulness, and modestly given to the medical world, with none of that blare of trumpets that has so often of late accompanied less deserving and successful effort, fully merits the reward and the renewed attention that will be given to it as a consequence.

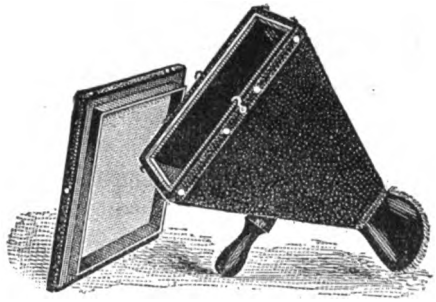
Professor Finsen's researches into the effect of light on human beings began with the investigation of the influence of light in smallpox. Only parts of the body, as the face and hands, that are exposed to the action of light during the course of the disease become disfiguringly pitted by smallpox. All the methods of treatment suggested for smallpox, before Finsen's investigations, that had any measure of success in the prevention of pitting had this in common—they kept the hands and face of the patient more or less thoroughly protected from light. This was accomplished in various ways, mostly without any direct intention of light occlusion on the part of the inventors, but fulfilling this purpose unfailingly. Professor Finsen then protected a series of smallpox cases from the light, and showed that this method of treatment sufficed in practically every case in which it was begun sufficiently early in the disease to suppress the secondary suppurative stage of the disease, and consequently to prevent all danger of pitting. It is almost needless to say that it is the secondary fever of the smallpox which constitutes the most serious period of the disease. It is at this time that the vast majority of the deaths from the disease take place, and that consequently Professor Finsen's treatment, far from being only cosmetic in its effects, saves many lives and much suffering.

Finsen was thus encouraged to investigate further into the action of light upon the skin. He found that the harmful effects of light were all due to the rays from the violent end of the spectrum. The light rays that affect a photographic plate, some of them beyond the violet in the spectrum, and so producing no sensation of light for human vision, are also factors in the production of irritative skin conditions. For the successful treatment of smallpox cases it was only necessary, then, to exclude the violet and related rays of light by means of dark-red glass. This discovery has been confirmed by many observers, and especially in our present smallpox conditions deserves more serious attention.

Finsen experimented with the action of light in other diseases, but without as much success as in lupus vulgaris. Lupus erythematosus was sometimes favorably influenced by phototherapy, but sometimes it was not. If the disease is due, as is thought by many, to the toxin of tuberculosis in contradistinction to its congener lupus vulgaris, which is the result of the presence of tubercle bacilli, then the difference in the effect of light on the two diseases would seem to point to a true parasiticidal action of light in the therapy of lupus vulgaris. This is confirmed by the fact that alopecia areata is always favorably influenced by exposure to concentrated light, for this disease is now very generally considered to be due to the presence of a parasite.

In recent investigations Professor Finsen has shown conclusively that light, apart from heat, is capable of producing effects in the skin that persist for long periods. Exposure of the arm for twenty minutes to the light of a 40,000-candle power, electric light, is followed by a severe inflammatory reaction, and then by pigmentation that persisted for several months.

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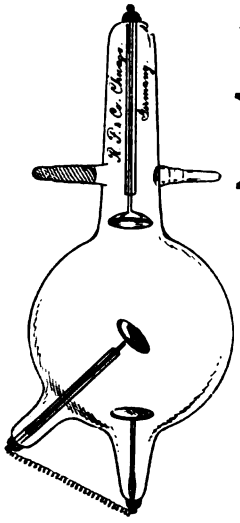
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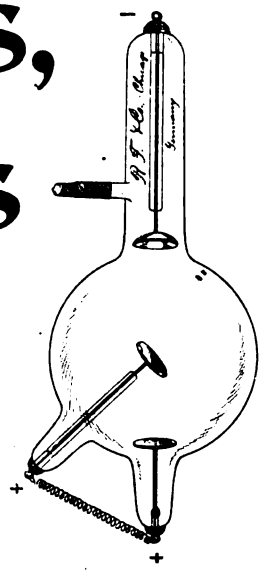
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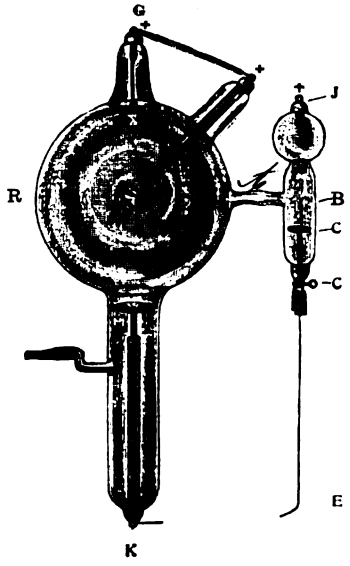
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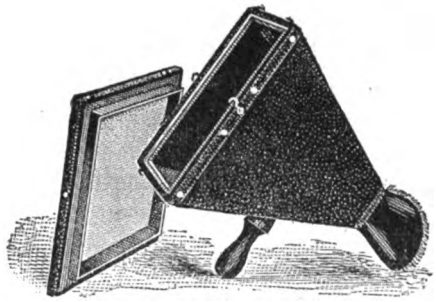
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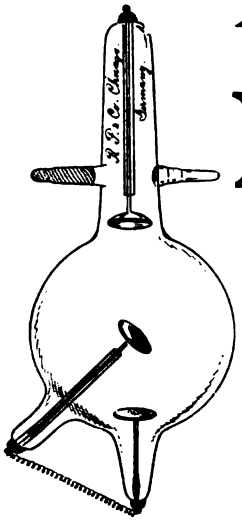
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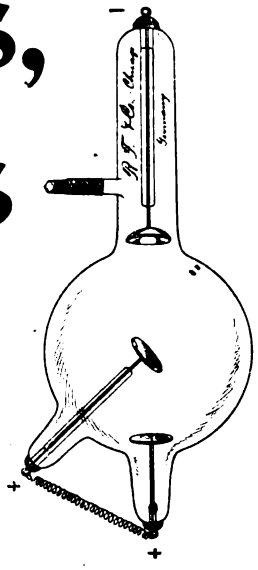
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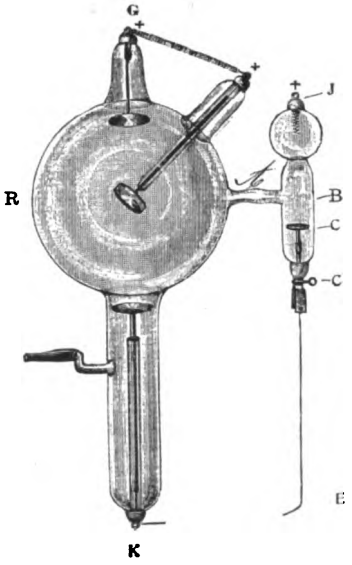
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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

NOTICE.

The February meeting of the Chicago Electro-Medical Society will be held at room 1233 Masonic Temple, corner State and Randolph streets, Tuesday evening, February 25, at 8 o'clock p. m. Dr. G. G. Burdick will read a paper on Electro-Therapeutics in Consumption.

PUS FOCI IN BONE—REPORT OF CASES.

By J. Sherman Wight, Jr., B. S., M. D.

(Read by Title before the Brooklyn Pathological Society, April, 1901.)

Mrs. C., age 24 years, married, consulted me September 17, 1900, for pain with limitation of motion at her left elbow joint. The family history showed that her mother's sister died of phthisis before the age of 25 years. Her personal history was good to six months ago, when she felt pain in the left elbow on lifting. This persisted and she consulted a physician, who treated her for rheumatism. Medicine had given her no relief up to the time she came to me.

Examination showed the forearm resting almost in complete extension with motion limited to an arc of 15 degrees. There was no perceptible swelling and the left elbow measured one-half inch smaller than the right. Pain was exquisite on percussion over the external condyle of the humerus.

A plate taken by me shows the X-ray picture of the left elbow. The darkened areas in the external condyle are due to the diminished density from disintegration of bone through tubercular disease.

I performed a linear osteotomy, removing the entire left condyle easily with a bone curette. This was a thin shell of bone surrounding dead bone and pus. The wound was packed and the arm was placed on a right angled splint. Repair was complete with motion through an arc of over 65 degrees and slight loss of pronation and supination, by November 3, 1900.

A. L., age 5 years, was brought to my office August 25, 1898, suffering with osteomyelitis of the lower end of the left humerus. The family history was good. The personal history showed that one year ago he had fallen and sustained a comminuted fracture at the left elbow joint. The arm had been treated in extension and union had taken place with ankylosis in this position. Swelling and tenderness continued at the elbow, sinuses formed and were discharging when I saw him.

I made a linear incision along the outer aspect of the elbow and cut through the joint with the osteotome. The forearm was brought up to a right angle and retained in this position on a splint. The wound was irrigated daily. The temperature ran an irregular course, coming down to normal in four weeks. At the end of three months union was firm, although a discharge continued from the sinus left in the wound of operation. November 12, 1899, I removed a small sequestrum and thoroughly curetted the bone surface. The following January the child developed a catarrhal pneumonia which ran the usual course with the sinus completely closed. On recovery the sinus reopened and discharged a thin watery pus.

The persistence of this discharge led me to take an X-ray picture, which shows a large sequestrum in position, outlined by the darkened areas running from the posterior border of the humerus to the joint, where they also designate the site of ligamentous union. This decided the final operation April 15, 1900, when the sequestrum shown on another X-ray picture was removed, including near its upper extremity a portion forming the central canal of the bone. The wound healed and the child has a useful arm, although stiff in the right angled position.

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Mr. McK., age 27 years, received a blow on the right tibial crest near the juncture of the lower and middle thirds. Pain and swelling persisted, aggravated by standing at his work, and finally becoming unbearable.

I saw him some months after the accident and took a skiagraph, which shows a pus focus in the tibia. This was verified by operation and the dead bone removed. Some sequestra found later and were removed at the final operation.

Mr. F., age 34 years, laborer, received a compound comminuted fracture of both bones of the forearm. The wound was infected and he was suffering from a well-marked cellulitis on admission to the hospital. This subsided after some weeks and the bony fragments were found ununited.

The skiagraph shows a pus focus and sequestra between the radial fragments and overriding of the ulna fragments. It was possible to plan and carry out in detail the removal of the dead bone and resection of the ulna and complete the operation by wiring the fragments from a study of the skiagraph.

GALVANIC TREATMENT OF GONORRHEAL ARTHRITIS

Mathieu (Gaz. Hebdom. de Med. et de Chir., No. 53, 1901) says that he has tried the galvanic method of treatment in six cases comprising thirty articulations seriously affected with gonorrheal arthritis, with and without periarticular swelling. The two electrodes are so fixed that the current will traverse the joint with an intensity varying between 20 and 50 milliamperes, the strength depending on the case. The duration of an application should be fifteen minutes. On the first day two applications may be given, but after that once a day is sufficient. The effects of this treatment are most remarkable. The symptoms are markedly decreased in from two to three hours after the first application, but the improvement is even more marked on the next day; the patient passing a good night. The pain is markedly decreased. The affected joint is less swollen, and its mobility is in part re-established. Recovery follows after from two to six applications; in one case it required fourteen applications for it to become complete. After recovery there is neither the atrophy of the muscles nor limitation of motion of the joint that is so frequently a sequel. Experiments have proved that the faradic current does not give nearly so good results as the continuous ones.—Therapeutic Gazette.

"A NEW CANCER CURE."

It was recently reported from Atlanta, Ga., that a case of cancer, in aggravated form, was cured by application of the X-ray. A telegraph operator there, whose lower lip and jaw were nearly eaten away, took fifteen treatments, and, it is said, considers himself perfectly cured of the terrible malady. The method of treatment was to apply the ray directly to the exposed parts for ten minutes, and to repeat this at intervals of three days. The last treatment was applied the middle of last April, since which time no indication of the return of the disease has appeared.—Pacific Health Journal.

PHOTOTHERAPHY.

Of the 456 cases of lupus in which treatment had been completed at the end of 1900, no fewer than 130 are known to be free from recurrence for from one to five years. For the rest the period of observation is shorter.

Infiltrations were treated by pyrogallic ointment; and boric acid fomentations were employed to clean the surfaces before the application of the light verrucose tuberculides were found to be favorably influenced by the light, but scrofulides of the subcutaneous tissue were unaffected.

Of 44 cases of lupus erythematosus, 14 were cured and 15 improved. Of 49 cases of alopecia areata, 30 were cured. No benefit was seen in favus, ringworm and sycosis.—Sequeira's abstract of Torchhammer's paper in Finsen's "Phototherapy."

MEDICAL JOURNALS.

Will you kindly place the AMERICAN ELECTRO THERAPEUTIC AND X-RAY ERA upon your exchange list, and we will in turn send you our publication regularly with each issue.

The Oklahoma Medical Journal is a welcome vistior to our sanctum, and is worthy not only of the support of the Oklahoma doctors, but also of their pride; for it is well filled with able articles, comparing well with the medical journals of the older states.

Dr. John E. Richardson of Brooklyn, who has been suffering from cancer many years, and whose case has been pronounced incurable, is now being treated by the new system of Dr. Finsen of violet rays. He resorted to this treatment as a last means after his case had been declared hopeless. A sun-ray machine was placed in his house, and every favorable day the rays were concentrated upon the patient and conducted down the throat.

After a treatment of several months' duration considerable improvement has resulted.

THE PRICE OF SUCCESS.

The conditions of success in any new development of practice in therapy are: First—Defamation; then to be "damned with faint praise," afterward to be so overwhelmed by praise illy bestowed that if the discoverer is not careful to discriminate differences, he will gradually become afflicted with what is vulgarly

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called "the swell head"; and unless this disease is promptly met with hard knocks, his days of usefulness will be numbered and he himself become one of the "has beens" who block the way of progress. This is our prognostication, based upon what we have found both by observation and by reading. Yet, though we say this, by no means would we say that we do not need the active brain, the steady, persistence of these quick-eyed and bold thinkers in all lines of scientific research. We know that by them the world grows wiser, and science is broadened, but why not save these brainy workers by at least extending to them the hand of fellowship, the word of appreciation, at the time when they most need it, and by our encouragement, wisely given, keep them from becoming Ishmalites—"their hand against every man," thus necessitating the writing of the remainder of the century's old saying, "And every man's hand against them"?

Undue praise we would not give, but the kindly word hurts no one, and there is no profession but needs the stirring up of new discoveries. So then, may we not tell each other in a true, fraternal way of what we know of work done, of points gained; nor feel that "etiquette" is offended, if by one means or another reports of what one or another has done finds its way "into print," though the aforesaid "print" is not devoted to any particular line of scientific research?

X-RAY CANCER CURE.

Seldom has such interest been aroused among physicians as was recently by an article dealing with skin cancer and its treatment by the X-rays by Dr. Charles Warren Allen, which was printed in the current issue of the Medical Record.

In his paper, which was read at a meeting of the New York Post-Graduate Clinical Society, Dr. Allen tells of the disease and theories of physicians as to cancer and its origin, and after referring to his observation of the gratifying results obtained by Dr. William Allen Pusey of Chicago in several cases of carcinoma of the skin, in which the X-ray treatment had been used, he says he was led to adopt it himself, and adds:

"I have thus far treated six cases of epithelioma—one upon the chin, two upon the nose, one upon the finger, one upon the forehead and one upon the cheek. Four were recurrent cases and one was primary. One disappeared from observation; the others have done well and might be considered cured, but are still taking ray treatment, and I trust will continue to do so for some months.

"Besides these cases I have observed others, and have seen several times in consultation a man with an extensive recurrence, in whose case the X-ray had been practically the only form of treatment applied. This extensive growth has decreased nearly half in size, and the general condition has improved, encouraging us to persevere in the treatment.

"The question as to how the rays act is as interesting as it is difficult to answer. I think, however, it may be stated that the belief held by some that it is necessary to produce a so-called 'burn' is erroneous. I have witnessed definite beneficial effects without any sign of such irritation. Pusey has demonstrated that a cure can be effected without any suspicion of this effect, and I have seen it in my own cases.

"If this were not so, the caustics already in successful use would scarcely warrant us in introducing another much more slowly acting cautery. Experiments so far have seemed to show that the bactericidal influence of the ray light is slight, though Rieder has recently found that in culture tube experiments bacterial life seems to be checked.

"Now, as to the proper application of the rays only general rules can be made. As we possess no satisfactory way of measuring the intensity of the light and as we never know surely the susceptibility of the individual, it is wise to be cautious in several directions. The first sittings should be short, with the tube not too close. The parts other than those to be operated upon should in all cases be protected.

"I employ various devices—a bandbox of pasteboard cut out to accommodate the parts and covered with extra thick tinfoil containing a large percentage of lead, or, better, perhaps, a thick lead mask put on over a gauze mask and bound to the parts. These I ground by running a wire to the chandelier to carry off the electricity. I have also suggested a funnel-shaped metallic cone, into the flare of which the active area of the tube is inserted, especially for mouth, throat, uterine and rectal work. It has been advised to cover exposed parts with vaseline.

"It is well after the first sitting to wait a week before proceeding with daily applications, and the time of exposure can be gradually lengthened. If signs of dermatitis or decided erythema show themselves, suspend treatment until these effects have subsided.

"As to the distance of the tube from the part treated, we must be governed by the patient's susceptibility, length of treatment already carried out, length of each exposure, hardness or softness of tube, nature and size of the diseased area and the operator's confidence born of experience. Hopkins advises a distance of twelve to thirty inches, while Pusey says about two inches for skin cancer work. Between these limits operators in general vary the distance from one or another consideration. Most of my work has been done at rather close range—three to five inches.

"Coming to the question, 'What are the dangers?' I may say I believe them to be overestimated. I saw some years ago several ulcerations from skiagraphy (usually after long exposure and without a protecting

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shield), and have since had numerous cases of loss of hair, dermatitis and persistent skin and nail changes brought to my notice, but almost always due to instantaneous exposure. I think these cases are growing fewer, in spite of the much more extensive use of X-rays. Unquestionably much damage might be done by the method in incompetent hands, and quacks may bring it into some disrepute, but the public's present fears of the rays should be allayed rather than intensified by the cautions so freely given."

Commenting on the above, Dr. Wm. I. Morton, Professor of nervous and mental diseases and electro therapeutics in the New York Post-Graduate Medical School and Hospital, says:

"I have found the X-rays eminently successful in treatment of cancer. I think we have found in it a cure for the malady, but yet we must wait for further proof before this is established without doubt. I have had fifteen victims of cancer under treatment, and of these three are cured, while all the others are progressing favorably. There is an increase in this dread disease, I believe, and I feel that many physicians who are interested are experimenting with the X-rays as a curative agent.

"In many cases, if no more could be done by the X-ray than to allay the pain, this of itself would be a boon—second, it is true, to cure, but important in that it obviates the employment of the ordinary narcotics. Let the facts speak for themselves in this the preliminary stage of the treatment of cancer by X-ray, bearing in mind that the relief from pain is procurable, not only in cases in which cancer is superficial, but in those where it is deep-seated."

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1. Accord to every person the same liberty you expect for yourself.

2. Accord to every person the same desire to do the right thing which you claim for yourself.

3. Accord to every person the same right to select or refuse medical aid which you desire for yourself.

4. Extend to every man who claims to be trying to alleviate disease the same professional courtesy which you expect from him.

5. Bear in mind that there is good in all schools of medicine and that there is something to be learned from every man.

6. Remember always that the final test of all remedies and theories is cures. Anything that cures is entitled to respect.

EPITHELIOMA OF THE GALL BLADDER.

By Dr. Deetz (Virch. Archiv, Bd. clxiv, p. 381); Ref. Brit. Med. Jour., Dec., 1901.

Reports four cases of stratified epithelial cancer of the gall bladder; in two a second primary cancer was found, the one a cylindrical epithelial cancer of the rectum, the other an adenocarcinoma of the ductus choledochus. The gall bladder growths showed in all the cases the typical structure of stratified epithelial cancer with cell nests, and in three prickle cells were found. In all the mucous membrane of the gall bladder was the original seat of the carcinoma. The occurrence of stratified epithelium in this situation is remarkable. Deetz considers the various possibilities of its appearance, and concludes that the only possible explanation is the direct transformation of cylindrical into stratified epithelium under the influence of abnormal chronic irritation. This must be a rare occurrence, since the author, in a careful examination of 300 gall bladders, never found stratified epithelium even in cases where gall stones were present.—Post-Graduate.

CHICAGO ELECTRO-MEDICAL SOCIETY.

The regular meeting was held in the rooms of the Illinois Laboratory, Champlain Building, January 28, 1902, President Burdick in the chair. In the absence of the secretary, Dr. Hall was elected pro tempore.

The following gentlemen, recommended by the membership committee, were elected members of the society: W. A. Pratt, M. D.; Rufus H. Bartlett, M. D.; H. J. Saunders, B. B. Masten, M. D.; H. S. Bunting, J. C. Pendergast, M. D.; F. C. Kossel, M. D.; E. S. Pettyjohn, M. D.; L. D. Rogers, A. M., M. D.; Paul Burmaster, M. D.; M. T. Seifert, M. D.; Finley Ellingwood, M. D.; H. Perkins Fitzpatrick, M. D.

The committee appointed at the last meeting of the society to consider the deposition given by W. C. Fuchs in the interest of W. E. Lash, against Dr. J. W. Fulwiler, who is a practicing physician of Bloomington, Ill., in the Circuit Court of McLean County, Ill., offered the following report, which was accepted and approved:

That this society recommends all physicians to restrict their patronage to those experts whose interests are identified with the interests of the medical profession.

Mr. Friedlander reported for the committee on halls, which after some discussion was instructed to secure a hall in the Masonic Temple.

The resignation of the secretary, Dr. Street, was read and accepted. Dr. T. P. Hall was unanimously elected to fill the vacancy.

Mr. Burch read his paper on the Treatment of Facial Blemishes by Electrolysis. The paper was discussed by Drs. Baer, Johnson, Pratt and Burdick.

The question of publicity was discussed by Professor Treadwell, Drs. Pratt, Baer, Burdick, Hall and Mr. Friedlander. The general opinion was that a reasonable amount of newspaper publicity is unobjectionable when restricted to a clear and accurate statement of facts. Dr. Baer moved: That this society shall take

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action against any member doing indiscreet advertising or anything calculated to do injury to the Chicago Electro-Medical Society. On motion the whole matter was laid on the table. President Burdick remarked that the matter belonged properly to the executive committee.

Adjourned. T. P. HALL, Secretary.

X-RAY WORK IN CONNECTION WITH A PENSION.

Representative Mann of Chicago introduced a bill granting a pension to Major E. C. Moderwell of $72 a month. Major Moderwell suffered a peculiar wound. A gold pen and holder in his pocket were struck by a bullet and pieces were carried into his body. A number of pieces of gold have been extracted from his body at different times and an X-ray photograph recently taken showed the positions of the pen and penholder in the upper part of his neck, near the base of his brain, where a surgical operation was too dangerous to undertake. The obstructions there have, however, affected the mental condition of the major and during the last few years he has lost his property and income and been incapacitated from mental labor, besides requiring constant attendance. Mr. Mann will make a determined effort to get his bill passed.

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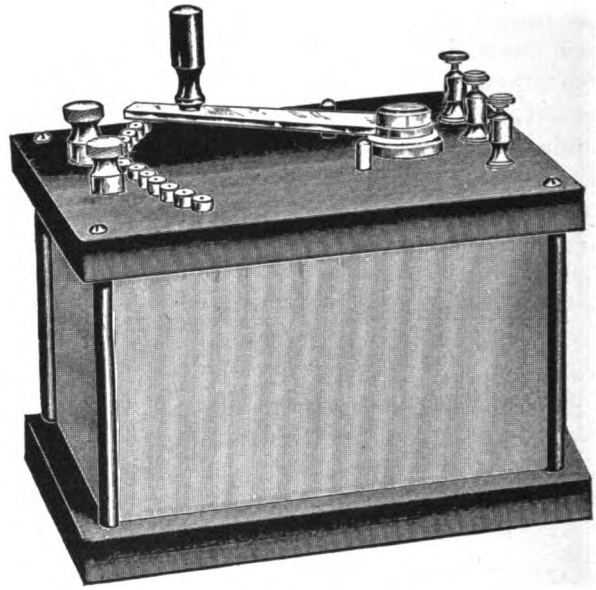
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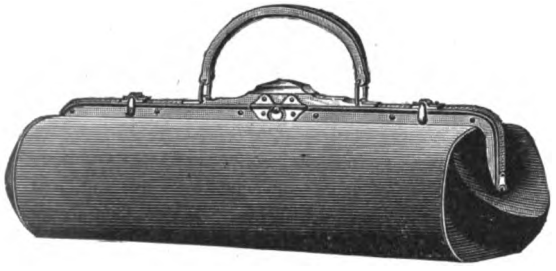
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VOL. II March, 1902 No. 3

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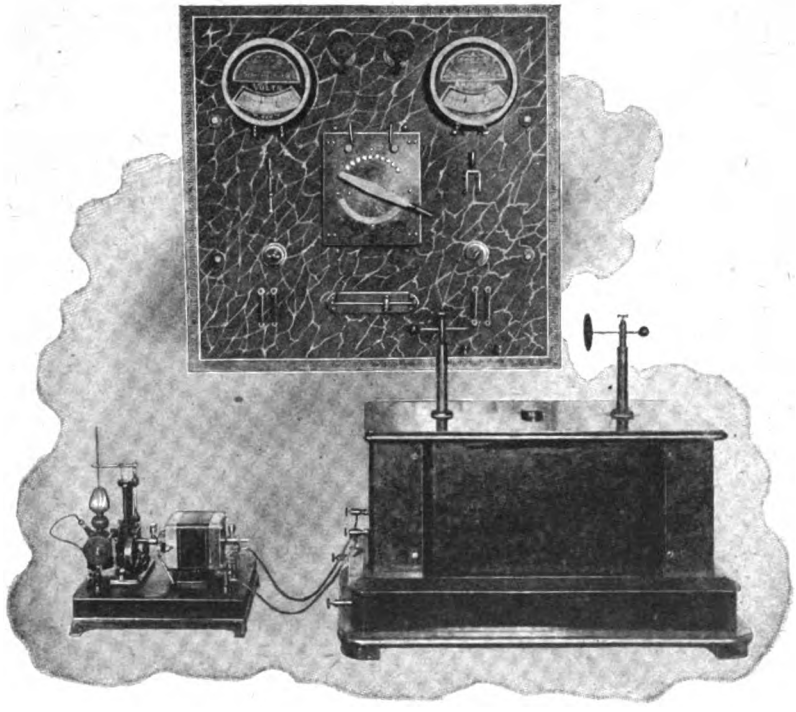
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VOL. II. CHICAGO, MARCH, 1902. No. 3.

CAN CONSUMPTION BE CURED BY MEANS OF THE X-RAY?

Paper read before the Chicago Electro-Medical Society Feb. 25, 1902, by

Gordon G. Burdick, M. D., President Chicago Electro-Medical Society, Prof. Radio-Therapy Illinois School of Electro-Therapeutics. Associate Prof. Surgery Post-Graduate Medical College. Surgeon People's Hospital.

In cases of simple tubercular infection among people with great recuperative powers there is no question in regard to the great value of the X-ray. It has been thoroughly demonstrated that the ray arrests the tubercular process, and if the body possesses sufficient vitality a prompt recovery occurs after its use without any other treatment. In people of low vitality, other means must be used in addition to the ray if a permanent result is to be obtained.

Abscesses of the lung must be carefully drained by means of compressed air, and the remaining lung tissue must be developed. The hard, dry cough left after the Ray treatment must be combated by means of nebulized oil with some mild sedative. Defective digestion needs continued attention. Constipation is sometimes produced by the Ray treatment, and must be looked after carefully.

Anemia, if profound, calls for the usual Feruginous tonics. If waste products are excessive, some good reconstructive substance, such as thicol, cod liver oil, albumen, etc., must be administered.

Physicians who have weak and inefficient apparatus and absolutely no knowledge concerning the physics of the X-ray vacuum should not expect to obtain favorable results in the treatment of the disease. We have no standard, excepting individual experience at the present time, to determine the proper working vacuum of a tube for medicinal use. Consequently, for some time, we must expect to have some discouraging reports from this source.

Physicians must not rely too much on the Ray as a cure, neglecting ordinary precaution in the treatment of this dreadful disease. If they will regard it only as a very useful agent, and give the patient intelligent medical care as the need of it may be indicated, they will be astonished at the favorable result they will obtain.

To obtain desired results, a powerful generator must be used and fine discrimination in regard to the safety limits of exposure, as the vacuum used is very close to the point where tissue necrosis will take place. If the vacuum is sufficiently high, it accelerates the growth of the tubercular process and the progress of the disease is hastened; therefore, great care must be used that the vacuum is at the proper point.

A curious result noted in a few cases wherein the treatment was pushed farther than experience would warrant, was the severe "bilious attacks" produced. The tongues became furred and dry, bowels constipated, coughs hard and dry, eyes yellow, digestions erratic, temperatures elevated and there was severe aching of the bones. In two cases I could produce this condition at will by giving twenty minutes' treatment. Care must be taken to ascertain that a possible infection of the bowels does not exist. Three cases proved the need, as after six weeks' treatment the temperatures remained at the same point, although the lungs were beautifully clear. By lowering the tube six inches and allowing the light to pass through the bowels, the temperature became normal after six weeks.

An important question to determine is when a patient may be considered cured of tuberculosis. It is doubtful if a patient is ever cured, when once infected, to the complete disappearance of the tubercular bacilli from the body. I consider the patient as cured when he regains his normal standard of weight, strength, and ambition, even if he occasionally does raise a little sputum in the morning in which may be found a few tubercular bacilli. It is in this last sense that radiologists refer to apparent cures of tuberculosis by means of the Ray. It has been known for years that the tubercular processes would be arrested if it was possible by means of forced feeding and the administration of certain drugs or foods so to improve the nutrition that the body began to take on weight. The patients would apparently recover their normal condition of health.

The trouble heretofore has been the inability to stop the rapid growth of the tubercular process sufficiently long to enable the enfeebled constitution to recover its normal vitality. It is in just such cases that the Ray has its peculiar value, inasmuch as it seems to hold in check the tubercular process and in some unknown way to stimulate the enfeebled tissues to greater activity and allow the body to regain its normal condition. Take a patient who under the best medical treatment could not recover, and he will slowly recover under the Ray, while in incipient tuberculosis recovery is rapid and prompt.

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A radiograph of the lungs always should be taken and the focii of the disease should be located before beginning treatment. Care should be used until it is ascertained how the patient reacts. Carelessness in the beginning may put the patient in bed, suffering from a violent case of poisoning from the liberated waste products, as the absorption is extremely rapid if the treatment is unduly pushed.

I have treated thirty-three cases of tuberculosis and have had occasion to stop treatment in only two cases. In those two the patients reacted so violently to the use of the Ray that it was inadvisable to continue the treatment. Both of the patients still are alive, although they discontinued treatment six months ago. They both are suffering from chronic tuberculosis, but are no longer bed-ridden, and are able to get around without much difficulty. They cannot be considered cured, but are much better than they were before treatment.

Mixed infection does not react so favorable to the Ray treatment. With four patients of this kind of tuberculosis I failed to get the proper results until I had injected them several times with antistreptococcin serum, when the cases ran the usual course and the patients eventually recovered. I have had six cases of joint tuberculosis in five years and have had the satisfaction of seeing five of the patients recover.

The apparatus used was a 12-inch coil with an interrupter giving about 2,700 interruptions a minute. A primary current was used, of 6 amperes, at 110 volts pressure. I have used various tubes, but prefer the Volthom or Queen tubes, as it is possible to keep them low enough in vacuum to give off the proper wave length for radio-therapeutic treatment. Exposures have varied from 10 to 15 minutes. Usually 15 is about right. Treatment was given through the clothing, as it was found that the liability to burns was diminished.

Three curious conditions have arisen in regard to the value of the Ray. Any physician agrees that its usefulness is thoroughly demonstrated in surface disease. But many deny the possibility of its usefulness in deeper structures, wholly ignoring the fact that the intense chemical light passes through the body and is just as active after its passage as before, which activity may be demonstrated by its manifestations on fluorescent salts and its reduction of bromide of silver, as well as by the profound effect on excretions and temperature. This skepticism is due to the fact that radiologists have confined their experimental work to surface disease in order better to study the effects of the treatment. The ever-present fear of getting an undesirable burn makes the course of their experimenting lively and unprofitable. But as their knowledge and technique has improved, some boldly invaded the body and have been astonished at the results they have obtained in what has been regarded as incurable diseases.

The results, on the whole, have been brilliant. But we are all reluctant to publish them until some satisfactory way is discovered of measuring the strength of the light used, as well as to develop a perfect working technique that others may follow, in order that the host of experimenters in this field may be led along the right lines instead of meeting a succession of failures which are sure to follow if they attempt this work without proper preparation.

Physicians with static machines should expect to be disappointed if they attempt the treatment of the deeper structures with the X-ray. So little current is generated by even the best of the machines that in order to pass the light through the body too high a vacuum is necessary. I spent nearly a year experimenting with them and found that even with a large 24-plate machine the best I could do was to get a therapeutic effect in lupus. There is no reason why a static machine may not be increased in efficiency by adding more plates, excepting the weight and consequent cost.

A wave length that causes the best fluorescence is very objectionable from a therapeutic standpoint. Its physiological action seems to stimulate disease rather than retard. Consequently we have to fall back on the coil, which possesses sufficient energy to force the Ray through the body at a wave length barely visible on a screen, yet possessiong the most intense chemical efficiency. It is this Ray that radiologists are using in the treatment of disease, a Ray that is unknown to the average owner of an "outfit." Consequently we dread the invasion of the field at this early day by an army of so-called "specialists," who have money, instruments, and considerable business ability, but no knowledge of electricity or the physics of the X-ray.

Misfortune is sure to follow the general introduction of the Ray in the treatment of disease. I know personally of the sale of instruments to at least thirty mechanics, electricians, and advertising specialists. These people are treating to-day some of the greatest diseases known to the medical profession. There is no way to stop their business, as the law is evaded by putting a photographic plate behind the patient from day to day while the exposure is given, ostensibly for the purpose of taking a radiograph. In reality the diseased area is only treated.

There is one encouraging sign, however, in the numerous damage suits brought against members of the medical profession, based on radiographs taken by irresponsible people outside the profession. Personally I hope the good work will go on until physicians realize that their interests are best conserved by physicians who are bound by the iron code of ethics, and not by the "almighty dollar."

The first published report of a treatment by means of the X-ray was by Dr. H. P. Pratt of Chicago, Chicago Medical Times, July, 1896, reported by Finley Ellingwood, and earlier in the year by the daily papers. The

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sensational manner in which it was brought out during the infancy of the Ray caused it to be viewed with considerable skepticism. Investigations that I have conducted lately confirmed his results. He had some tubes, constructed by a local glass-blower, that were worthless for radiographic purposes, but were ideal for radiotherapeutic purposes. The tubes are in existence today. While he did get remarkable results in the treatment of the disease, he was unable to make a satisfactory radiograph until recently, because of his wrong conception of a proper working vacuum.

Hahn reports that a patient suffering from chronic pulmonary tuberculosis was exposed by Rieder to the X-ray, but with no encouraging results. Dalinger states that Begonie and Mongour report two cases of acute phthisis in individuals who were in bad condition, owing to poor nourishment and excessive use of alcohol. The results were negative. But in lingering pulmonary tuberculosis slight positive results were noted. In another case there was rapid improvement in the general condition, and the strength and appetite increased, but the local process remained unchanged.

A third patient improved locally and generally during the first month of treatment and then severe digestive disturbances appeared. Dr. Sinapos, in August, 1897, published a pamphlet in which he gives an account of his use of the X-ray in the treatment of tuberculosis. He cites a number of cases in which he obtained excellent results, but the careless way he wrote his paper leaves much to be desired.

Southgate Leigh gives a report of a case of tuberculosis in the elbow joint, which is reported by Werner. The elbow was exposed to the Ray for two hours from two to three times a week, and after twelve hours' exposure the inflammation had disappeared and the patient was free from recurrence for eighteen months when reported upon.

Dalinger states that Kirmisson reports a case of tuberculosis of the wrist joint which had improved by daily sittings of ten minutes' duration for two and a half months in which the patient was cured completely by elastic compression following the X-ray treatment.

Dr. Ivar. Bagge of Goteberg, Sweden, reports a case of tuberculosis following a severe burn of the chest and back by scalding water. The case has existed for seventeen years and finally became so bad that the patient was sent to a hospital. He contracted a cold and succeeded in inoculating his nose while sick, and was turned over to Dr. Bagge, in January, 1900, for X-ray treatment, with the result that the wounds on both front and back were healed in three weeks. Dr. Bagge states that the striking point in this case was the fact that the patient was only treated on the front of the chest, but that he cured the larger ulceration on the back as well as those under the axilla as quickly as those below the clavicle.

I reported in the "American Electro-Therapeutic and X-ray Era," during July, 1901, thirteen cases of pulmonary tuberculosis and five cases of joint tuberculosis in which, at least, six months of time has elapsed since the treatment was discontinued. I can report sixteen cases in addition that have been treated since the report was made.

In every one of these cases a microscopical examination was made to determine the diagnosis, and a radiograph was taken of the lungs. There can be no question as to the value of this agent in the treatment of tuberculosis. The erratic results obtained in the reported cases can only be explained by a lack of knowledge concerning the use of the Ray. When the experimenter happened to use the proper tube—that is, one useless for other purposes, a prompt and surprising result occurred. When he used a tube that gave off good X-rays, that is a fine tube viewed on the fluorescent screen, no results were obtained, which only confirms my previously expressed opinion that many failures are sure to be reported just as soon as the treatment comes into general use.

The average "X-ray expert" would consign a tube to the junk pile just at a time when it becomes most useful and when it is really worth its weight in gold in the treatment of disease. Therefore, success cannot be expected from his hands.

I have to thank Dr. J. J. Morgan, who has extended the courtesy of his bacteriological laboratory to me, and who has kindly made a number of examinations for me. The only other physicians I am under obligations to are Drs. Chas. Simon and Rockwell, who have sent me a few cases.

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3000 Michigan Ave.

Discussion.

Dr. Gilman heartily commended the paper both for its convincing report of work done and for its sound views regarding the effect of the treatment on the system of the patient. From his studies in sanitary science he had come to look upon the growth of bacteria as due to a scrofulous condition caused by a sluggish action of the lymphatics. A region of land poorly drained is not unlike this scrofulous condition of the body. It becomes a favorable soil for the growth of bacteria.

Early in 1896 he was much interested in work done by Dr. Pratt in testing the effect of the X-rays on different pathogenic bacteria. He was soon led to advocate the use of the X-ray on the diseases now extensively treated by this agent.

Dr. Hall said he had been looking up the literature of the subject and was much interested to see the opposing views regarding the efficacy of X-ray treatment in tuberculosis. The reports were not generally definite enough for one to judge concerning the quality of the X-ray used, but he now had no doubt that more consistent results would have been obtained if a medium low tube had in all cases been used. There was likewise disagreement as to the bactericidal power of the X-ray, due probably to the use of tubes having different vacuums. The statements in the paper on this point are very important.

Dr. Grubbe held that the static machine might also be used to excite the X-ray tube. He used both the static machine and the coil, treating some patients exclusively with tubes excited by the former. He admitted that the same tube would give a more powerful X-ray from a coil than from a static machine, and so when using the latter he gave longer treatments, in some cases four or five times as long as for coil treatment.

Regarding experiments on the bactericidal power of the X-ray, he said that even when the bacteria had been destroyed in culture tubes, it might well be due to the ozone generated at the terminals of the coil. Special care ought to be taken to prevent this free ozone in the air from reaching the cultures within the test tube. On the other hand, the X-ray should not be sent through the walls of a test tube because glass is quite opaque to the non-penetrative X-rays.

Dr. Pratt was much pleased with the paper. He felt that negative results in later experiments did not impeach his early work on the germicidal power of the X-ray. This work was done under the auspices of the Bennet Medical College. Dr. Wightman furnished the cultures. A number of species of bacteria were killed. It required long exposure with low tubes. At first the bacteria seemed to thrive, but after a few more exposures they were killed. He held that the X-ray would lose little of its power in passing through the glass test tube and the stopper of absorbent cotton would not allow free passage to the ozone. He stated that though Dr. R. Zeit reported no effect of the X-ray on cultures of bacteria, most experimenters admit that the X-ray is antiseptic. This ought to mean that the X-ray destroys bacteria.

Dr. Pratt held that the tubercular bacilli are of the same chemical elements as the lung tissue. Both the bacteria and the body have a certain amount of vital force. The X-ray being a high potential electric current, produces decomposition or dissociation of the weaker of the two structures. It is therefore important to use the needed tonics to strengthen the vital force of the patient. The tubercular bacilli are then decomposed.

Dr. Clemensen stated that he assisted Dr. Zeit in the experiments mentioned above. They exposed tubercular sputa and afterwards inoculated guinea pigs. He stated that in no cases were they able to destroy the bacteria in the sputa.

Dr. Burdick spoke more in detail on Dr. Zeit's work in which he assisted. They experimented on several different species of bacteria, some of them being non-pathogenic. Their results were not altogether satisfactory. The chromogenic properties of some species were affected, but none destroyed. The tuberculous sputa was placed in petra dishes over which was glued paper

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both to insure isolation from bacteria in the air and to prevent germicidal action of the free ozone. Some sputa was exposed as long as two hours. As a control experiment several guinea pigs were inoculated from the sputa before its exposure to the X-ray. Another set was inoculated after the exposure. Both sets of pigs invariably developed tuberculosis; those inoculated from the sputa before X-ray treatment, had the disease in three to four weeks, the rest in three to four months or longer. This seems to suggest that while the X-ray did not destroy the bacilli, it lessened their virulence. C. H. Treadwell, B. S.

THE THERAPEUTICS OF THE X-RAY.

By John A. Lee, M. D., Associate Surgeon St. Mary's Hospital.

Read before the Medical Society of the County of Kings.

Scarcely five years have elapsed since Roentgen first gave to the scientific world the first practical demonstration of the availability of the excitation of Crooke's tubes.

Medical science, always alert for the fulfilment of its mission, quickly appropriated to its own use the practical side of this epoch-making discovery.

Of the wonders of medical and surgical pathology suddenly disclosed to our view it is unnecessary for me to speak. The well-recognized place which Roentgenism has gained in diagnosis cannot be lost. But I am not here to defend the diagnostic advantages of the rays. I would rather present for your discussion this evening another phase of the discovery of Professor Roentgen, and one until lately unsuspected; the value and extent of which at present is in a somewhat undecided state. I refer to the therapeutic uses of the X-rays in skin diseases and closely allied conditions.

While the study of the physical side of the X-rays presents many problems worthy of exacting thought, and while the manner in which the rays act may be explained only when those problems are solved, yet as practitioners we are concerned only with results.

No doubt in many instances extravagant and baseless claims have been made in X-ray therapeutics, notably as to the results in tuberculosis and neuralgia, yet I believe we have by no means reached our limit, and I feel certain the future will broaden the scope of this work.

In looking over the results attained in the past two years, I have selected certain cases as types of conditions, the successful treatment of which may pretty safely be expected.

But before we proceed there are certain misconceptions which must be corrected and some points made clear. First, the X-rays are not bacteriacidal; in fact, they rather stimulate bacterial growth, and herein they differ from the action of sunlight, violet light, or Finsen's light. Second, the exposures are neither long nor numerous. Third, with this treatment there is no operation, no anesthetic, no pain, and the scars are superior to anything hitherto done. Fourth, the results have been obtained in a class of cases the treatment of which has baffled medical and surgical minds for generations, or in cases the surgical treatment of which results in multilation. Fifth, it is unnecessary to set up any dermatitis.

Having stated these points, and they can all be demonstrated, we will consider some cases. We naturally turn to lupus as the disease most successfully combated. The reports of the successful treatment of lupus by the X-rays have occupied a prominent place in our journals for the past year. Whether lupus can be totally eradicated or only kept quiescent is an interesting question. I believe from my own experience, and from cases I have studied, that we do not completely destroy the disease, but the results of the treatment are such that we always affect a practical cure. My point is well illustrated by the report of a case treated by C. Thurston Holland, M. R. C. S., and reported in the Archives of Roentgen Ray, London, May, 1901. In 1899 he had reported a case of lupus of the face treated and cured for the time being by the X-rays. The case remained quite well for a period of two years, when there was a distinct evidence of the return of the disease. Between May 9th and 21st, 1900, the diseased area exposed again six times, the lupus was again cured; the whole scar has remained in a healthy condition up to date. This result, I think, we can expect in our most obstinate cases. Does any other treatment offer more? Does any other treatment offer as much?

Mr. Startin reports before the Roentgen Society of London a rodent ulcer cured in twenty-five applications, and Dr. Low finds rodent ulcer much more amenable to the X-rays than lupus, and in the Philadelphia Medical Journal for December 8, 1900, Johnson and Merrill report six cases of slowly growing epithelioma treated by the X-rays. All were benefited and several were cured, the ulcerated surface being replaced by a soft, painless scar.

In two cases of hypertrichosis, Jutassy reports good results. Haben and Albers say we can expect 30 per cent cures in all cases of skin disease. And Schiff and Freund report favorably in cases of sycosis and favus. The rays have been disappointing in the treatment of psoriasis. The ulcerations of inoperable carcinomata can be much benefited, pain and discharge rapidly ceasing under treatment. Brilliant work has been done upon nævus. Jutassy reports an especially interesting case. The patient, a man 22 years of age, had a port-wine stain which covered the whole of the right side of his face and involved the mucous membrane of the mouth and nose as well. The treatment was continued

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at frequent intervals until a dermatitis was established that detached the epidermis completely from the nævus. It took this two months to heal, and at the end of that time the nævus was gone. A year and a half later it was noticed that the greater portion of the skin was perfectly normal.

This résumé of the therapeutic applications of the X-rays I desire to present for your discussion and consideration. Cognizant of its limitations, I cannot but feel that its brief record is worthy of a trial at your hands. I wish especially to call your attention to the fact that the conditions in which it has been most signally successful are those very diseases that heretofore medical science has combated with only moderate success. My own cases illustrate that point. The first is a case of lupus vulgaris of twenty years' standing, having been under constant treatment for the past ten years, was getting progressively worse. The second, a case of lupus erythematosis of four years' standing, had been actively treated for two years and was in such a position that any destruction of tissue would be a mutilation.

Cases.

Case I. Mrs. Mary D. Aet. 46. Married U. S. Three children. One daughter has tuberculosis, otherwise family history is negative. Previous history negative. Present illness. About 20 years ago first noticed a pimple on right side of nose. A crust formed on this which was picked off. This process continued, a larger scab forming each time for several years; the ulceration enlarging very slowly, Ten years ago the diagnosis of lupus vulgaris was made, and since that time she has constantly been under treatment. Koch's tuberculin was injected, she was cauterized several times under anesthesia, and five years ago she underwent a very extensive plastic operation, always with negative results. On May 11, 1900, she came to my clinic, at St. Mary's Hospital, praying me to do anything, even an extensive excision, as the lupus patch was extending rapidly. An examination at that time revealed an extensive sloughing ulcer extending around what was left of the right side of the nose, and fleshy septum. Externally, a line of ulceration extended to the inner canthus of the right eye, and internally the mucous membrane and the tip of the inferior turbinated bone were involved. There was catarrhal conjunctivitis of the right eye, caused probably by the discharging pus from the inner canthus; and from the nasal part of the ulcer there was a foul-smelling discharge. For a year she had suffered greatly from pain.

At this time there had been very little reported work in the X-ray line. A few cases in Germany and one or two in England. I do not believe there had been any reported cases in this country,* and it was in a skeptical mood that I wished to try the X-rays, and while I did not promise nor expect any favorable results, the patient was willing to try anything. From the middle of May until the middle of July the nose was treated irregularly about twice a week. It showed the now well-known reaction from the first. In a short while the crusts began to dry up, the discharge ceased, and what was still more remarkable, the eye which had been partially protected by tin-foil, cleared up, although the spot continued above the inner canthus. The region of the inferior turbinated bone was still swollen to such an extent as to almost occlude the opening. The patient was not under treatment from July until November, when she came back complaining about her eye. The disease had become active here and this spot received five treatments. I then decided to endeavor to remedy the inside of the nose. The lupus in this location was especially difficult to treat because of its distance from the surface. Between November and the following July, for various reasons, the treatment was very irregular and did not average more than once a month. Since July she has had no treatment whatsoever. The greater part of the lupus patch has had no treatment since July, 1900, but there are one or two spots now that need treatment. In this case there was no pain as a result of the treatment, and the dermatitis excited was much more extensive than was necessary.

Case II. Mrs. Margaret Q. Aet. 33. Mar. U.S. Three children. Family and previous history negative. Present illness. About four years ago she noticed a small purple spot on the left side of the nose; this spot gradually became larger and was surrounded for a considerable space by a large red and inflamed area. Treatment was unsatisfactory, and three years ago last February she applied to the skin department of the Vanderbilt Clinic. She was treated for five months by various ointments and then carbolic acid cauterizations were inaugurated and continued for a period of four or five months. The patient complained severely of the pain and discomfort of this operation; in fact, from the first she was troubled with a painful sense of congestion; as she said, "the nose felt twice its size"; there was evidently a catarrhal rhinitis, for the nostril on that side was nearly always occluded. This treatment was finally stopped. She then underwent patent medicine treatment, and she says cuticura resolvent produced an intense inflammation all over her face. After her experience with this, all treatment was discontinued for a year. On June 27th she was referred to me for X-ray treatment.

Examination showed the bridge of the nose and contiguous portions of the face were in a diseased condition, and the overlying skin was deeply infiltrated and of a purplish hue. There were several small scattered areas, and an especially large patch over the right lower jaw. The bridge of the nose was first selected for treatment, a lead foil mask protecting the rest of the

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face. The bridge of the nose received four treatments; the large patch upon the jaw was treated four times. Then a spot between the inner canthus of the eye and the right wing of the nose was given three treatments, making eleven treatments in all. There was very little dermatitis and the skin was not injured. She has had no treatment in four weeks. I do not think the case is yet cured, but the skin takes on a more normal appearance day by day. There was no pain, and the treatments lasted between ten and fifteen minutes.

Discussion.

Dr. Winfield: I am glad to have the opportunity of seeing the cases and hearing the doctor's paper. I have had no personal experience in treating skin diseases with X-rays. Regarding the correctness of diagnosis, there is no shadow of doubt about one being lupus vulgaris and the other lupus erythematosus. Darier, the French dermatologist, has made a number of microscopical examinations of skin that had been exposed to the action of the X-rays; he found the epidermis thickened in all of its layers, while there was atrophy of the hair-follicles and some of the glandular elements. His conclusions were that the ray acts as a powerful irritant, increasing the vitality of the least differentiated elements of the skin while the hair, nails, and glands are atrophied. The therapeutic deductions are these: the X-ray is useful in treating skin diseases where there are certain conditions present. First, when it is desired to produce atrophy of some of the appendages of the skin, as in hypertrichosis. Second, when it is necessary to stimulate the tissues, as in chronic eczema, or lupus erythematosus. Third, to destroy mycotic organisms, like the tineas. Fourth, to destroy tissues of low vitality, as in lupus vulgaris. The best results obtained from the use of the X-ray in dermatological practice has been in the treatment of hypertrichosis, repeated sittings will eventually produce complete atrophy of the hair-follicle. The first case of lupus treated by this method was reported by Schiff of Vienna. The second, and the first in the United States, was by a former member of this Society, Dr. P. M. Jones of San Francisco.

The most extensive work being done in America in this line, at present, is by Dr. Pusey of Chicago, who has written quite extensively on the subject. In comparing this with the Finsen method, it would seem that the X-ray was the better of the two. The Finsen apparatus is expensive, the application is painful, it often being necessary to anesthetize the patient, a great number of sittings are required, which makes the treatment expensive, and the resulting scar is not as sightly as that obtained by the X-ray. While there have been cures reported by both methods, there are no positive evidence that they are permanent. I doubt they will ever become popular, because of the expense, the comparative risk of application, and as good results can be obtained by well tried and simpler methods.

The doctor should be congratulated on the excellent results obtained in both of the cases, and I think the Society is to be congratulated on the fact that its younger members are doing original work and are bringing to it their results and deductions for discussion.

Dr. Gordon: I saw this case before Dr. Lee began his treatment. It was certainly a most unpromising case. It seemed without hope, and it didn't seem to me that there was anything more that could be done, and I saw it from time to time during treatment, and the result was certainly most pleasing, and a fine result, as you see it here—such that I have become a very enthusiastic advocate of this form of treatment, in watching this first case he has presented of twenty years' standing.

Remarks.

Dr. Lee: Mr. President, as to the method, it is very simple. I place the patient about twelve inches from the tube, and cover the face, with the exception of the part about to be treated, with lead foil, then turn on the current for about ten minutes. A point I wish to emphasize: It is unnecessary to cause a dermatitis.—Brooklyn Medical Journal, February, 1902.

*Note.—The editor here wishes to state that, as already reported in a paper read by Dr. G. G. Burdick, before the Electro-Medical Society of this city, and printed in this issue, "the first published report of the treatment by means of the X-ray was by Dr. H. P. Pratt of Chicago, in the Chicago Medical Times of July, 1896, which was reported by Dr. Finley Ellingwood."

A PRECURSER OF X-RAYS.

In the 31st volume of "Wiener Zeitschrift fur Kunst, Literature, Theater un Mode," edited by Dr. von Frank, No. 234, Nov. 23, 1846, page 938, is found the following very interesting notice:

"The Human Body Transparent! The Greek physiologist Eseltja has, according to the Atheneum, made the announcement that he has succeeded, with the aid of the electric light, in seeing through the human body. He claims that he has watched the disease processes in the intestines, also the digestive process, the circulation of blood and the movement of the nerves. If this 'Anthroposcope,' as he calls it, is more than a cheap advertisement, the old proverb, which says that no one can see into the heart of man, has been set at naught."

What must have seemed like a hoax to the journalist of that day becomes to us of great interest in connection with Prof. Roentgen's discovery.—Chicago Pan-Path.

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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

NOTICE.

The March meeting of the Chicago Electro-Medical Society will be held at room 1233 Masonic Temple, corner State and Randolph streets, Tuesday evening, March 25, at 8 o'clock p. m.

MEDICAL JOURNALS.

Will you kindly place the American Electro-Therapeutic X-Ray Era upon your exchange list, and we will in turn send you our publication regularly with each issue?

CHICAGO ELECTRO-MEDICAL SOCIETY.

The ninth regular meeting was held in room 1233, Masonic Temple, February 25, 1902, at 8 p. m., President Burdick in the chair.

The minutes of the last meeting were read and approved with a correction as to the place of meeting. The secretary was instructed to correct the minutes of the meeting of November 26, 1901, by adding the statement that the gentlemen who then made application for membership were elected.

A bill of four dollars for elevator service for the last two meetings was ordered paid.

The treasurer, Dr. Street, presented a report showing the amount of cash on hand; and called attention to the fact that the annual dues for 1902 were payable in January.

Dr. P. C. Clemensen, recommended by the membership committee, and Dr. J. C. Brubaker, by a committee of the whole, were elected members of the society.

An interesting and instructive paper was read by Dr. Gordon G. Burdick, entitled "Can Consumption Be Cured by means of the X-Ray?" The paper was discussed by Mr. Burch and Drs. Gilman, Grubbe, Hall, H. P. Pratt and Clemensen.

Dr. Burdick also exhibited a mechanical vibrator adapted to the alternating current.

On motilon of Mr. Friedlander the executive committee was instructed to correspond with the Roentgen Ray Society of America regarding the proposal to hold its next meeting in Chicago.

The committee on scientific research presented a preliminary report on priority in X-ray therapeutics.

On motion the secretary was authorized to purchase all necessary blanks and stationery, and the treasurer was instructed to pay the hall rent regularly as it becomes due.

Adjourned at 10:10 p. m.

T. P. HALL, Secretary.

OBITUARY.

We regret to announce the death of Dr. Christian Fenger, one of Chicago's most eminent surgeons. He has been on the Faculty of the College of Physicians and Surgeons, the Chicago Medical College and Rush Medical College, and has served as surgeon in many hospitals. His articles in the medical journals have marked him as one of the leaders in surgery. In 1899 he was given an honorary degree by the King of Denmark.

We believe that he was yet skeptical regarding the therapeutic value of the X-rays, though he recognized their value in diagnosis.

Dr. Fenger's kindness to poor patients is well known. One of his former students tells this story: The doctor had received a telephone call to the house of a rich man, whose wife was ill. Being overworked, the doctor had referred him to another physician. Shortly after a poor man came into his office and told him a pitiful tale of his sick wife. He at once drove to the poor man's house.

Frequently patients coming to his dispensary were sent home in his carriage.

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HOW TO MAKE YOUR STATIC MACHINE WORK IN MOIST ATMOSPHERE.

The man with a static machine, usually, and, in fact, nearly always, has troubles of his own, especially during the hot, moist weather of the months of July and August, and along rivers, lakes and the coast.

Static machines are variable and fickle, but are governed by certain laws which must be obeyed. Moisture and dust are the greatest troubles to contend with. No matter how tight the case may be, dust and moisture will get into it. Some machines are less susceptible to the atmospheric conditions than others, and notwithstanding the claims made by makers, there is no machine that can be depended upon to generate always under every circumstance and condition. We may so alter the circumstances and modify the conditions that we can be reasonably sure of our machine working, but never be absolutely certain of it.

Some machines have a smaller machine, or charger, inside the case, in order to start the current and charge the larger plates, but even then they sometimes fail to work. The glass and mica plates should be covered with a coating of shellac. Hard rubber plates are left bare. Various methods have been tried to keep the air inside the cases free from moisture, such as lamps, incandescent lights, electric coil heaters, jars of sulphuric acid, common lime, and chloride of calcium, but lamps, lights and coils heat too much, acid gives off destructive fumes, lime dust flies. The most generally used and probably the most satisfactory, when all else is considered, is fused calcium chloride. This is not the ordinary chloride of lime of the stores, which is chlorinated lime, or bleaching powder, which gives off the fumes of chlorine gas, which will ruin the metal parts, but the fused chloride of calcium which comes in rough, hard lumps. It should be thoroughly baked, bone dry, in a deep, flat granite or earthen vessel and kept inside the case all the time. Being very hygroscopic, it quickly absorbs all the moisture in the case and keeps the air within quite dry. As it gets wet it becomes soft and sticky, and should then be removed and again thoroughly dried or baked. Do not allow it to get on the stove or metal part, as it will ruin it, but when carefully handled it is safe and reasonably sure. The same calcium can be used over and over indefinitely. Probably the safest, quickest and cheapest way of drying the case is the jar of cracked ice and rock salt. Do not use snow or common salt, or forget the saucer, but use as follows: Take a one-quart glass fruit jar with screw top, fill with a mixture of powdered ice and rock salt, screw down the cover and wipe the moisture from the outside of the jar; place the jar in a saucer or bowl inside the case of static machine, close the door and set the machine in motion, keeping the plates moving until the machine begins to generate at its best. After, say an hour, when the ice is fairly melted, remove the jar and quickly close the end door so as to prevent the outside air from getting into the case. This simple remedy will dry the air within the case in from five to twenty minutes. Materials for this experiment are accessible to every physician at all seasons of the year, and the application of this remedy is entirely free from the danger of corrosion of the metal parts of the machine and the annoying care and labor of frequent drying and baking of chloride of calcium.

Apply the remedy when next your machine refuses to generate, and it will insure the very best of results in the operation of your machine on any and every day in the year.

Simply holding a pledget of absorbent cotton against the revolving plate while in motion will often cause the machine to generate at once, especially the rubber plate machines.—The Electro-Therapeutist, January, 1902.

A GREAT X-RAY IMPROVEMENT CLAIMED.

E. W. Caldwell describes in the current Electrical Review a new apparatus designed for stereoscopic vision for X-rays. It has been developed in the laboratory at the Bellevue Hospital Medical College, New York city.

By using two sources of X-rays in the same tube, each eye views independently the shadow, with the result that the picture stands out distinctly, showing all the space relations of the objects viewed.

It is thought that this method will be of the utmost value in surgery, permitting immediate examination of broken bones, etc., as if they were viewed by the eye with their positions accurately indicated, instead of in silhouette effect, as has been the case heretofore. —N. Y. Times.

CANCER CURED BY X-RAY.
NEW HAVEN PHYSICIAN DISPERSES A GROWTH OF THREE YEARS.

That cancer can successfully be treated by means of the X-ray has again been demonstrated by Dr. C. E. Skinner at New Haven, Conn., who has just cured L. S. Manville after a course of treatment of five weeks' duration.

The cancerous growth was of three years, and was not susceptible to the usual treatment. It was as large as two ordinary apples, eleven inches wide and seven inches deep. It had arrived at a stage where Mr. Manville's family physician thought he was certain to die in a few weeks. The physician suggested X-ray treatment.

To-day a blemish on the left side of his face and neck and only a skin scar are all that remain to mark the cancer.

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THE NEW YORK STATE CANCER LABORATORY.

In June of last year this laboratory—which was the first ever organized for the collective and scientific study of cancer, and which has been followed and imitated in England, Germany and Russia—passed under the control of the New York State Board of Health, after an independent existence of over three years. During that time they have done a vast amount of research work, in co-operation with foreign societies and laboratories; and they have been honored by the visit of a special investigator two years ago from the National Cancer Society of England (who, upon his return, reported most favorably upon the work done here), and by the appointment of two of their staff—Dr. Roswell Park and Dr. H. R. Gaylord—as foreign members of "The German Society for the Study of Cancer."

In the Fourth Annual Report of this Laboratory, Dr. Roswell Park—who, it will be remembered, was one of the physicians in attendance upon our late President McKinley—writes:

The results of our past year's work have been to strengthen our ever growing convictions that cancer is an infectious disease, which are both sustained and confirmed by the work of leading observers all over the world—i. e., men who are everywhere regarded as authorities. Moreover, we have never seen any reason to alter the statements upon which in the beginning this laboratory was largely founded—namely, that cancer as a disease is on the increase. This has been abundantly shown by returns from various other state boards of health, as well as by statistics from nearly every civilized country in the world where adequate records are kept. If cancer prove to be a parasitic disease, the importance of its recognition may be perhaps better estimated from the good that has already come from the discovery of the parasites peculiar to malaria and yellow fever, since now that they are known we have learned how to prevent and eradicate these diseases.

Much has been said in recent literature of the value of the Roentgen or X-ray in the therapy of cancer. I would like to report that generous friends have offered to supply the necessary apparatus for experimentation in this direction and that the General Hospital will supply the space and the accommodations required for the same. I shall hope, therefore, with the next annual report to be able to say something upon our results with this somewhat hopeful remedy.

The scientific world will await with interest the publication of their next Annual Report.

Dr. Charles L. Leonard of Philadelphia writes in the Medical News of the advances made in diagnosis by the X-ray of renal and ureteral calculi. Cases frequently come to the physician that are obscure, but which point to some difficulty of the urinary tract beyond the ken of the doctor. Often these are referred to the surgeon for "explorating incision, without further effort toward diagnosis."

Dr. Leonard has well demonstrated that "the accurate determination of the position and number of the calculi has resulted in limiting the field of operation, and in rendering the intervention more accurate and complete, while it excludes the danger that menaced from the unrecognized involvement of the other kidney or ureter in the calculous disease. It is no longer necessary to perform an exploratory nephrotomy upon the healthy kidney before doing a nephrectomy, or to open a healthy kidney in the search for a calculus that is obstructing the ureter lower down. Incision into the kidney, during an exploratory or any other operation, is only justified by the detection of a calculus by the Roentgen method or an obvious pathological lesion.

"The chance of error in the negative diagnosis is very slight, and the calculi that may be overlooked are so small that their final expulsion is certain. There are as yet patients in whom it is impossible to make an absolute negative diagnosis on account of their size. In suitable cases hydronephrotic and displaced kidneys have been demonstrated; while calculi have been detected in patients weighing over 200 pounds. In such cases when great detail is demanded in the skiagraph or the difficulties to be overcome are out of the ordinary, it is sometimes necessary to make repeated exposures before a satisfactory result is obtained. When, however, such a result is obtained, it enables the diagnostician to demonstrate the accuracy of his results to those capable of appreciation."—The American Medical Monthly, February, 1902.

KILLS CANCER BY CUTTING OFF BLOOD IT FEEDS ON.

For a heroic surgical treatment of cancer Dr. Robert H. M. Dawbarn, visiting surgeon to the city and Polyclinic hospitals, has been awarded the Samuel D. Gross prize of $1,000.

The prize is awarded by the Philadelphia Academy of Surgery, which is trustee for the fund.

Dr. Dawbarn has found an operation for malignant cancerous growths in the head where such growths cannot be cut out.

The carotid arteries convey the main blood supply to the head. The main carotids divide the neck into branches. The operation consists in cutting out external carotids in both the left and right sides of the neck, thus depriving all of the head save the brain and eyes of the main supply of blood. The operation is one which a few years ago would have meant death to the patient, but now is entirely practicable.

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The cutting off of the blood supply not only stops the growth of the cancer, but, by continued deprivation of nutriment, causes the gradual but steady lessening of the growth.

This heroic treatment has been as successful as it is daring. The first person operated upon by Dr. Dawbarn went under the knife seven years ago. He had a malignant growth of the pharynx. He is now in good health and able to attend to business every day.

It is said that if this plan of treatment had been known at the time of General Grant's last illness the life of the illustrious soldier might have been greatly prolonged and his sufferings much lessened.—Rocky Mountain News.

"X-RAY BEATS THE DOCTORS."

We copy the following from "The Daily News" (Jan. 25), in an article treating upon the lecture course instituted by that enterprising paper:

Charles Keim, a lad who lives in 25th place, thanked the Daily News last night for providing a lecture in which he and many others saw a bullet in one of his arms after doctors had probed for it in vain. All the 800 persons at the John Spry school, Southwest boulevard and West 24th street, saw their own bones for the first time with the aid of X-ray apparatus. The "coil," the largest part of this apparatus, was made especially for the Daily News lecture courses, which opened last night in eleven centers.

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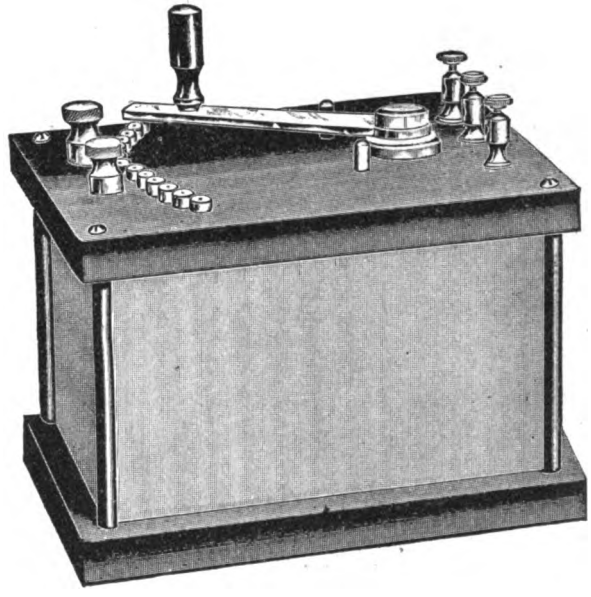
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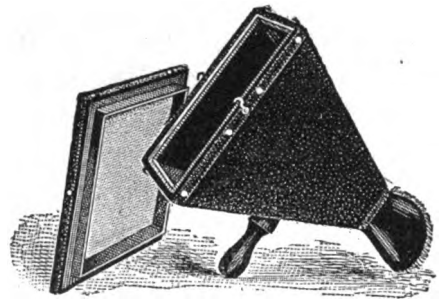
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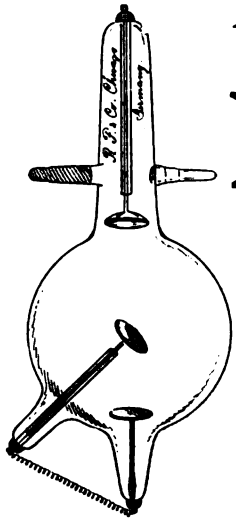
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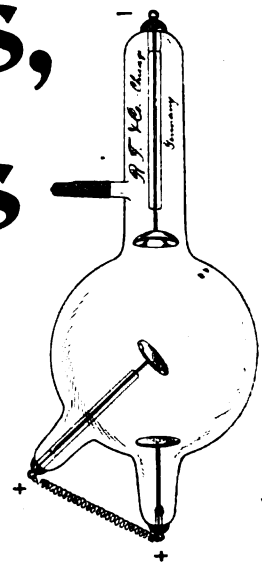


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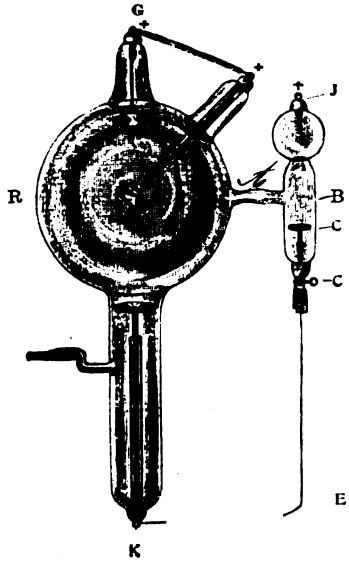




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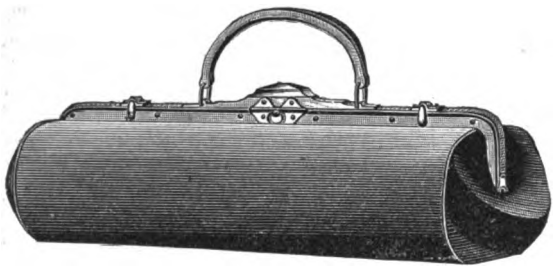
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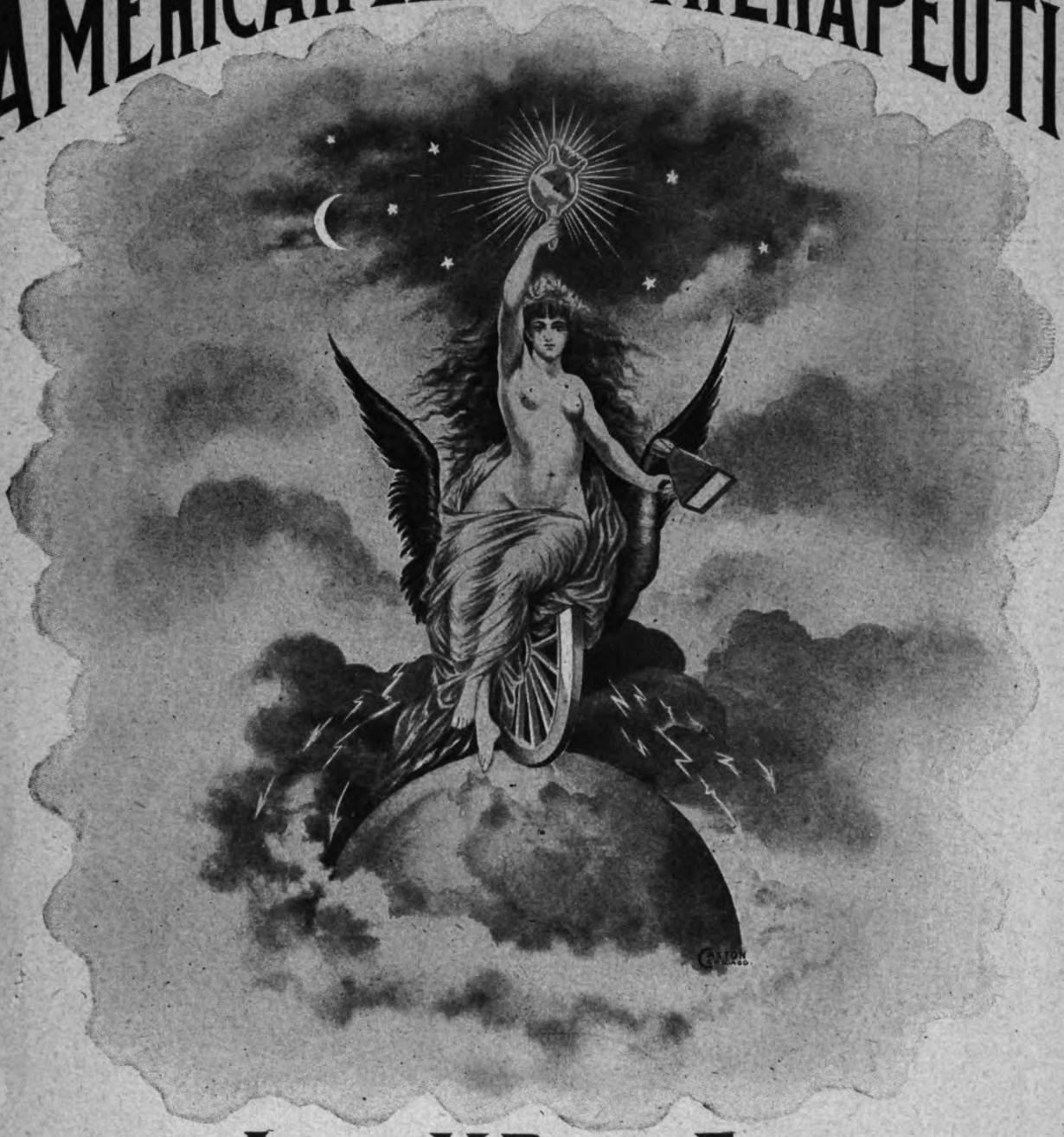
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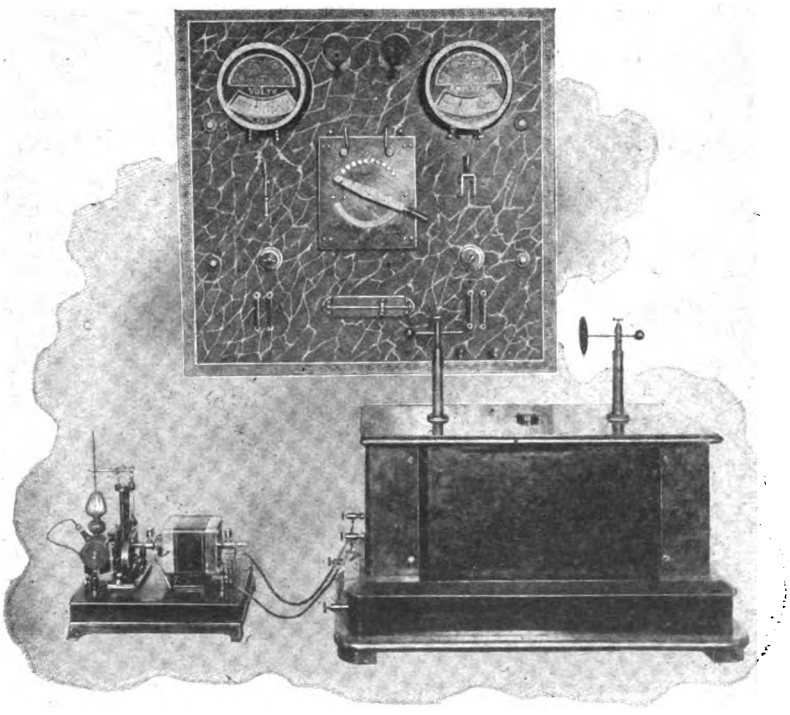
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VOL. II. CHICAGO, APRIL, 1902. No. 4.

THE ROENTGEN RAYS IN FORENSIC MEDICINE.

By Mihran K. Kassabian, M. D.

In charge of Roentgen Rays Laboratory and Instructor in Electro-Therapeutics in Medico-Chirurgical College and Hospital, Philadelphia; Chairman Medico-Legal Committee of American Roentgen Rays Society.

Read before the New York Medico-Legal Society, October 16 1901.

Mr. President and the members of the Medico-Legal Society:

It is a great pleasure for me to read a paper before such a distinguished body of professional men, on a subject of such great importance in diagnosing obscure conditions, in relieving suffering humanity and in guiding physicians and jurymen in the right direction.

Since the discovery of the X-rays, many important medico-legal cases, both in this country and in Europe, have been decided by their aid. I have had a number of cases of a medico-legal nature, brought either by the physicians or lawyers, and it has also been my privilege to make X-rays diagnoses and skiagrams of more than 6,000 patients who were brought to the hospital and to the clinics of the college during a period of five years, some of which subsequently took on a medico-legal aspect, requiring my presence in the courts as an expert witness, but space will not permit me to mention them here. The X-rays in this class of cases are of unquestionable value, first to the physician, in sustaining a doubted diagnosis; secondly, to the patient, who is suing for damages, and thirdly to the judge and jurymen, to whom medical nomenclature is unintelligible, and to whom "seeing is believing." The lawyers know very little about fractures and dislocations, but by this method they can acquire a clear understanding as to the character and extent of an injury, the amount of deformity, etc. By this means also the lawyers can decide whether a case should be compromised or taken to court. Very often skilled surgeons and physicians will be called as expert witnesses, and their opinions will be so conflicting that a bad impression is left with judge, jurymen and laymen—they do not know who to believe. As a result of my large experience, I do believe that the information given by this method may be regarded as absolutely conclusive, although it may be a deliberate contradiction of the opinions of the best and most highly qualified observers. Any layman, with a skiagraph before him, can see what by any other means would be only a matter of probability or conjecture.

The court is generally glad to accept any scientific methods which will make clear the intricate questions brought before them, so that the use of the microscope in examining the blood, the photographing of criminals for identification, and many other scientific procedures are admissible in the court, among which and possibly foremost, is the evidence of the X-rays. However, there are wrong and prejudicial opinions in the minds of some surgeons and laymen as to the reliability of the X-rays diagnoses, and they claim that there are fallacies and errors and distortions referrable to this means of diagnosis. This may be true to a certain extent, but it is not the science that is at fault, but the incompetency of the persons entrusted with the work of making the X-rays examinations. The expert who has had a large experience never makes mistakes. He can see many truths that are invisible to the uneducated and untrained eye. In certain states the X-rays evidence is admissible, while in other states only the fluoroscopic examination in the court room is accepted. We will look at the value of the X-rays from the standpoint of the patient, and of the physician, in case of malpractice.

The first question asked by the patient after an examination is the result—what is the diagnosis?

It is often very difficult for the physician or surgeon to answer such a question as this. If a hesitating answer is given, it will cause suspicion and if a snap diagnosis is made, it is worse than telling the patient that you cannot answer at present, without studying the case. A doubtful answer or an uncertain diagnosis cannot be changed or corrected, and the patient may not come to the physician again and will go around telling people of this diagnosis made by Dr. ———, whereas in reality it was not a diagnosis, but an attempt to evade a direct answer.

The medical profession does not advertise, as the merchant or the business man, but each patient is a walking advertisement, and will recommend to fellow sufferers a doctor who accomplished such good results for him. One mistake, or one moment's carelessness, may cost him his life-long and hard-earned reputation. Unfortunately when a young physician or surgeon begins to practice among so many fellow practitioners, his first patient may be one with a chronic disease, or one who has been treated by half a dozen other physi-

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cians; or it may be an accident case, a fracture of the elbow, which if improperly diagnosed and treated, may result in a stiff, deformed, useless joint; and if this happen in a small town, the physician will be constantly reminded of this unfortunate mistake, by meeting this deformed patient at every street corner, so that it would be better for this young physician to leave the town and begin elsewhere.

The physician should be extremely careful in his diagnosis treatment and in giving a prognosis. An early diagnosis, and proper treatment are interrelated and interdependent, the one to the other, in obtaining a good result. One point should be born in mind, namely: a patient should be warned of possible bad results following certain operations upon the joints.

This may be defined according to Taylor—"The bad or unskilful practice on the part of the physician or surgeon, whereby the health of the patient is injured."

Negligent malpractice embraces those cases where there is no criminal intent or purpose, but merely negligence in bestowing the attention which the condition of the patient requires. Ignorant practice is an administration of medicines or the treatment of a disease or injury in a way calculated to do harm, and in a way unbecoming to a skilled and scientific medical man. It is a recognized fact that the numbers of claims for alleged malpractice, in recent years, is increasing, the majority of them being the work of blackmailers encouraged by a class of lawyers who are willing to champion a case for the chance of a fee. A suit for malpractice, even without foundation, is always an injury to the reputation of the physician. His intimate friends who know his innocence of the charge may be unmoved by it, but the general public, and his enemies, may use it as a weapon, to do him harm and injury. So extreme care must be taken to avoid this kind of suit, if possible. Nearly all the suits of malpractice may be traced back to the following points:

Failure to make an early and correct diagnosis of a case, which we may class as neglect. The symptoms of fractures are very often identical with the description in the text-book, and again they vary greatly, and are often mistaken, even by experienced surgeons especially, when occurring in the elbow, shoulder, and hip. I have seen many cases that were diagnosed as simple Colle's fracture and put in splints, and it was found afterwards that the condition was a simple sprain. And I have also seen the opposite mistake made.

The proper treatment of a case requires careful and earnest study on the part of the physician, and there are certain empiric and scientific laws laid down in text-books that must be followed. For instance, the direction of a fracture, whether oblique, transverse, or longitudinal, whether intra-capsular, intra-articular, or external injury, which will alter the treatment and determine whether a limb must be put in a bandage or splint, and whether it requires extension. How often it happens, even in the practice of the most experienced surgeons, that a sprain is diagnosed, and after several weeks, shortening of the limb occurs, bearing witness to a wrong diagnosis. How often we notice stiff elbows, the result of being immobilized for a supposed fracture, when such treatment was entirely unnecessary. I will mention one out of many such cases that have come under my notice. Mr. S., age forty years, with a history of pain which started over the neck of the bladder, causing suffering for a period of five years, and for three years intense pain, with frequent micturition, and all the symptoms indicating either the presence of a stone in the bladder or an enlarged prostate gland or cystitis. He had been treated by specialists who diagnosed his condition as enlarged, tubercular prostate gland. He had been in one hospital for three or four months, and in another for two months, being treated for neuresthenia. A sound was introduced with negative results. X-rays examination showed a phosphatic stone weighing four ounces which was removed by suprapublic cystotomy, the stone was encysted and behind the prostate gland. The patient recovered. Do you not call it malpractice to allow this patient to suffer, and lose wages for this long period of time, due to wrong diagnosis? An X-ray examination, in this case, would have saved this man years of suffering, and much loss of time. Space will not permit me to mention similar cases, where failure to use this modern, authentic and reliable method of diagnosis resulted in suffering and death. Velpeau and Sir A. Cooper altogether made seven mistakes in diagnosing such large stones, they were excusable in their time, but, in the twentieth century, such mistakes are not excusable.

Taylor says, physicians and surgeons are bound to give their patients their best judgment, but they are not liable for errors of judgment. If the errors of judgment, however, are so great as to be incompatible with reasonable care, skill and dilligence, the physician or surgeon would be liable.

After asking the first natural question, what is the diagnosis? the patient will ask a second and more difficult question—what is the prognosis? This is a more difficult question to answer. The answer must be given with care and caution. We surgeons and physicians neither guarantee nor assure a good and useful limb after a fracture or dislocation. It is always safe for the physician to answer in truth and explain all the possibilities, not promising good results, but telling the patient that he will do his best under the circumstances. The answer depends upon the diagnosis, the severity and variety of the diseased condition or injury, and the constitution and circumstances of the patient, and

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the mode of treatment. In some cases where the diagnosis is absolute, and the plan of treatment reasonably certain, the prognosis may be approximately given. In some cases we know that we cannot give a good prognosis, as in fracture of the elbow joint which is usually followed by deformity and loss of function; and in intracapsular fracture of the hip, where shortening of the limb is the general result. The prognosis will be favored by good general condition of the patient and lack of complicating conditions. The treatment may be all right, but if the patient is subject to epileptic seizures, he may fall and displace the ends of a properly reduced fracture; in such case, the physician or surgeon is not responsible. In medico-legal cases, the patient generally claims some of the following points: He may claim that the physician did not properly diagnose a fracture, or a dislocation, or the presence of a foreign body, etc.

2. He may claim that the physician delayed treatment in the reduction of an existing unrecognized dislocation or fracture, and that prolonged confinement in bed, with loss of wages, resulted.

3. He may claim that the deformities have resulted from unreduced dislocation, or improperly set bones, or lost or impaired function of a joint, either temporary or permanent; ankylosis, neuritis, or palsies, due to the pressure upon or inclusion by exuberant callus, caused by too early removal of the splint or excessive massage.

4. He may claim the unnecessary amputation of a limb.

By use of the Roentgen rays, the foregoing claims may be modified either in the interests of the plaintiff or the defendant. The foregoing claims may be prevented, if the physician makes it a practice to have early and skilful skiagrams made of his cases, if he gives a guarded prognosis in all cases, and is careful, conscientious and scientific in his method of treatment, following the most approved method of treatment in each case. Taylor says: "If a physician or surgeon departs from generally improved methods of practice, and the patient suffers an injury thereby, the medical practitioner will be held liable no matter how honest his intentions or expectation was to benefit the patient." The use of the X-rays is so universally commended in the modern works on surgery and medicine, that if a surgeon fails to apply them in doubtful cases, he may justly be accused of negligent practice. In medico-legal cases, the X-ray diagnostician is likely to be asked the following questions:

1. Does the skiagram show fractures in all cases in which they exist? This question may be answered that not only will a fracture be shown in all cases, but the texture of the bone, and the relative densities of the surrounding parts will also be shown, and any disturbance in the texture will also be noticed. Rupture of ligaments and cartilages, tendons, diseased conditions of the bones, etc.

I present to your inspection a skiagram of a normal hand which shows ten separate layers of an arm, namely, the upper surface of the sleeve of the coat, the upper surface of the shirt sleeve, the upper surface of the cuff, skin, muscle, two portions of bone, compact, cancelous, lower surface of shirt sleeve, lower surface of cuff, and lower surface of coat. This shows that the X-rays does not only show the shadow of the bone and muscle, but by skilful technique shows the different densities.

2. Does the skiagram show the callus formation? Yes, it may be seen in a period extending from the sixteen days after the fracture until the time of ossification, which may be as late as three months from the time of accident. The duration of this callus formation varies according to the age and health of the patient, and whether the fracture is simple or compound, and its location. When the bones are in perfect apposition, the callus formation will be hastened. Massage will also facilitate its production. It will be seen from the foregoing uncertain factors, that it is not always easy to predict how long it will be before callus will be strong to support the parts, but by skilful X-ray examinations, the amount and density of the callus may be determined.

3. Another question often asked is, "Is the fracture united, or not?" The answer to this question will depend upon the age, general health, local complications, and mode of treatment. By means of the fluoroscopic examinations, however, we can tell definitely whether union is firm, by pressing upon the bones and at the same time viewing through the fluoroscope; also by the skiagraph we can tell the amount of callus, which, to a certain extent determines the strength of the union or the causes of non-union, and by this revelation either protects the physician, or accuses him if he is in the wrong, preventing many malpractice suits, and many contrary statements of the experts.

4. In cases of deformity, we may be confronted by the question, was this deformity avoidable, or not? The avoidable cases are those resulting from an incorrect diagnosis on the part of the surgeon, or improper treatment. The unavoidable cases are those of oblique fracture where the over-riding of the bones cannot be prevented; extra or intra-capular fracture of the head of the femur in old age, where shortening is inevitable; in compound comminated fractures where it is necessary to wire the ends of the bones, which results in shortening; and in intra-articular fractures resulting very often in ankylosis of the joint. Injuries to the epiphyses may also cause atrophy of the joints and muscles.

Functional disability and degree of deformity do not bear a definite relation to each other, as the deformity

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may be great and the patient still have good use of the part, and vice versa. The avoidable causes are those in which the physician's diagnosis or treatment is at fault, while the unavoidable may be due to certain intra-articular fractures resulting in ankylosis, inclusion of nerves causing limited movement of the limbs, etc. Many cases of deformity and loss of function are permanent, while others may be improved by long continued treatment. In summing up the value of the X-rays in medico-legal cases, the patient will be benefited by a correct diagnosis and proper treatment. The physician by this means will avoid the possibilities of claims of wrong diagnosis, and if they should be brought, he has a means of protecting himself. In addition, many suits may be discouraged, or compromises effected outside of court, by the ability to give a clear and definite statement of the condition of the injury.

It is sometimes necessary to tell the age of a person, or a dead body (for identification) or in case of rape where the age of a girl is in doubt, when all ordinary distinguishing marks are absent, and this is ascertained by the fact that the epiphyses of the bones are known to ossify at definite ages, and by making X-ray examinations of the bones, and knowing at what age ossification takes place, an approximate estimate of the age of the individual may be determined. The age of a fetus can also be discovered by this means. The hydrostatic test for the determination of still-born infants may be corroborated by the X-rays, as the lungs will appear opaque if they have never been inflated, whereas if the child has breathed they will be more transparent.

As an evidence of death the X-ray plays an important part. After death, the pulsation of the heart is invisible, and the organ presents a sharp outline. This will comfort those minds who are possessed of the time-worn horror of premature burial.

Points of the Technique of Medico-Legal Skiography.

The technique in these cases does not vary greatly from that in any X-ray examination, except that especial care should be taken to have good, clear negatives. It is most important to have a detailed report of the case, as to the time after the accident, course of treatment, and physical signs of the accident. Examine carefully first with the closed fluoroscope, in a darkened room, so that the patient himself, or his attendants, may not see the result of the examination. Place the plate in position, in the presence of witnesses and have a distinguishing mark upon it, such as a key or ring, for purpose of identification. Keep record of such details as the time of exposure, distance of the Crooks' tube, position of the tube and part, etc. Take negatives from different points of view, and if possible take the injured and normal parts upon the same plate, for the purpose of comparison.

Now study the negative, provided it is satisfactory as to technique. Compare with previous negatives you have taken of the same part of the body and also with the corresponding normal part of the same person, being careful, however, to ascertain whether the supposed normal part has ever been the seat of a fracture. Print several copies, light and dark, so you can choose the print that shows the condition the clearer. Write on the negative the names of the bones, and try to make the picture intelligible to any one who examines it. Also make a tracing on the card, which will facilitate a proper understanding of the picture to untrained eyes. Having now made a positive diagnosis, write your expert diagnosis in a clear manner. An X-ray diagnosis will carry more weight in court if made by a physician, than if made by a man who is merely a photographer or a manufacturer of X-ray apparatus.

When called to court as an expert witness in a medico-legal case, it is important for the X-ray diagnostician to prepare himself carefully on the anatomy and pathology of the parts, to take with him negatives and prints of his X-ray examination, together with a set of bones of the part under consideration. When on the witness stand he should be careful and accurate as to his statements, remembering that the opposing party may also have an expert witness who would be likely to disprove his statements.

I cannot do better in conclusion than quote the sensible, manly advice given by Sir Wm. Blizard of London. He says, "Be the plainest of men in the world in a Court of Justice. Never harbor a thought that if you do not appear positive you must appear little and mean. Give your evidence in as concise, plain and yet clear a manner as possible. Be intelligent, candid and just, but never aim at appearing unnecessarily scientific. State all the sources from and by which you have gained your information. If you can, make your evidence a self-evident truth. Thus, though the court may at the time have a mean opinion of your judgment, they must deem you an honest man. Never be dogmatic or set yourself up for judge and jury. Take no side whatever, but be impartial and you will be honest."

In conclusion again, I desire to say that I am of the belief that this distinguished body realize the importance of X-rays in forensic medicine, having already been of great aid in diagnosing and deciding complicated legal cases appearing before the courts.

By hearty co-operation of both the legal and medical men in the future, the X-rays diagnosis will furnish the most scientific and unerring evidence in such obscure cases.—Medico-Legal Journal, December, 1901.

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LATEST DEVELOPMENTS OF THE "FINSEN" METHOD OF TREATMENT OF LUPUS.

By Dr. Kattenbracker, Spandeau, Germany.

Not until a few years since did Dr. Finsen of Copenhagen come forward with his epoch-making discovery that the actinic rays of the spectrum supply a remedy for one of the most troublesome and stubborn diseases, conducive to the most unsightly disfigurement of the features—namely, lupus. Both as regards its unfailing efficacy and the final result of its skin-healing and beautifying action, the newly discovered cure was destined to overshadow and far surpass all the methods previously tried, such as surgical operations, escharotics, cauteries of the many various kinds, etc. In view, however, of the inadequacy of all the older remedies then known, it is not to be wondered at that in medical circles the new therapy was at first generally regarded with a certain skepticism. But presently the vast number of patients who had been cured by the "Finsen" method of treatment of lupus in its most acute forms compelled a recognition by medical authorities of the undoubted fact that it really is feasible to utilize the bactericide properties of actinic rays—which, in themselves, had already been known for considerable time—in combating an affection, such as lupus, which may be said to have hitherto defied practically all known remedies.

The mode of employment of actinic light rays which are now in general use and which, in Germany in particular, are adopted even by the universities, is commonly known to be as follows: Sunlight or electric arc-light is concentrated by means of powerful condensing lenses and directed onto the diseased part through water cooling apparatus; the seat of the disease being at the same time made as nearly exsanguious as possible by the pressure of special rock crystal glasses, so that the rays may the deeper penetrate the tissues. The treatment is perfectly painless, as the heat rays contained in the light are almost entirely absorbed by the layer of water or sulphate of copper. A fact, which may be assumed to be generally known, is that the bactericide action can be claimed solely for the actinic—i. e., the blue, violet and ultra-violet rays. Now, wonderful as were the results which had already been achieved by the "Finsen" method, a great many obstacles, nevertheless, stood in the way of its introduction into general use. Primarily, the heavy expense involved in the necessary equipment, amounting as it does to something between £150 and £300, entailed, as a direct consequence, the erection of special premises and the provision of a large staff of attendants, inasmuch as each period of treatment lasts at least an hour, during which a special attendant is required for each patient to manipulate the pressure glass. (At Dr. Finsen's own establishment a number of ladies, belonging to the better classes of society, give their services for this purpose voluntarily.) Then in addition to sunlight, which is only available for therapeutic purposes in certain seasons of the year, and during a limited number of hours daily, powerful arc-lamps (of, say, 80 amperes) have to be used. Also the number of actinic rays which are obtainable (and no other rays can be employed) is comparatively small, seeing that, in the spectrum of the rays, which must, of course, be eliminated by means of the water filters, etc., already alluded to. The object, therefore, was to find a source of light which, contrarily to the usual carbon arc-light, should show a preponderating proportion of actinic light rays and as small a proportion as possible of heat rays. The experiments which were made with this object by the engineer, Kjeldsen, at the "Finsen" Institute, and which involved the employment of an almost inconceivable variety of metals as electrodes, in lieu of carbons, led to the surprising discovery that it is precisely the spectrum of iron that is particularly rich in actinic rays, while it only contains very few heat rays. On the strength of this discovery Kjeldsen has devised a special lamp for carrying out the "Finsen" method of treatment, in applying which he employs hollow iron electrodes, which are internally cooled by running water. As was pointed out by Bang at the Congress of Naturalists at Hamburg, the trials, first made at the "Finsen" Institute, led to a result which, in the therapeutic respect, went beyond all expectations. There is obtained light of high intensity, with which within three minutes the same therapeutic, or rather bactericidal, effect is secured, which in the old arrangements could not be produced in less than about an hour. Reports such as these were calculated to give rise to more searching tests, and these were carried out at the institute of Dr. Aufrecht, in Berlin, with the object of ascertaining the effect of the light of an iron electrode lamp upon bacteria, the following being a summary account of the results:

The arrangements made for the experiments were as follows:

Source of light: Five ampere-continuous-current; light issuing from iron electrodes, with means for cooling by water; pressure of lamp, forty volts; distance from source of light, ten centimeters; light not concentrated.

The feeding substrata were 15 per cent of gelatine for gonococci and tuberculous bacilli, and 2 per cent of glycerine agar uniformly coated with sterilized blood. As test objects the following micro-organisms were adopted: b. Typhus abdominalis, b. cholera asiatica, b. Streptococcus pyogines, b. coli communis, gonococci and b. tuberculosis.

The "sowing" of the bacteria was effected by delicately spreading superficial beds of cultivation, carried by sterilized blood serum for a vehicle, upon plates with

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a feather. All cultivation plates, including those which for purposes of observation were treated with ordinary light, and which had been similarly infected, were maintained at a temperature of 22 degrees Centigrade, or 37 degrees Centigrade, as the case might be.

After forty-eight hours the illuminated parts were inoculated with glycerine agar, and for two days maintained at a temperature of 37 degrees Centigrade. Then came the question of ascertaining by the growth of the colonies, or (alternatively) by the extent to which the tubes remained sterilized, whether the bacteria were still viable or not.

The progress of each experiment and the corresponding result in the case of each of the pure cultivations are embodied in the following table.

For the sake of brevity I have adopted the following marks: *, growth; †, precise time when development was checked, and ‡, destruction.

Micro-organisms.	Duration of Test.	Effect.
b. Typhus abdom	1 Seconds	†
" "	3 "	*
" "	30 "	*
" "	60 "	‡
Observation	60 "	*
b. Cholera asiat	5 "	*
" "	30 "	*
Observation	60 "	†
b. tuberculosis	5 "	*
" "	45 "	*
" "	60 "	*
Observation	45 "	†
Mikroc. gonocc	1 "	*
" "	5 "	*
" "	30 "	*
Observation	60 "	†
Streptoccoc. pyog	2 "	*
" "	15 "	*
" "	60 "	*
Observation	60 "	†
b. coli comm	1 "	†
" " "	5 "	*
" " "	60 "	*
Observation	5 "	†
b. anthracis	1 "	†
" "	5 "	*
" "	30 "	‡
Observation	30 "	*

Although I do not by any means take the view that tests made with cultivations of bacteria on plates are conclusive with regard to the human system, it is none the less the fact, which these tests have clearly brought out in practice, that the bactericidal power of the actinic rays, and especially their curative effect, have been established beyond doubt in the cases of innumerable patients, and that what we have before us is an apparatus leading to the same results in considerably less time than it would be otherwise feasible, and with a material reduction in the expenditure of electrical energy. For, whereas, with the old "Finsen" arrangements from 80 to 100 amperes of current was required, the new lamp now introduced under the name of "Dermo" by the "Sanitas" Electrical Company of Berlin, and placed on the market in a particularly handy form, demands only five amperes to produce in three minutes the same effect which it previously took nearly a whole hour to secure. And as consequently not only a great saving of time is effected, but the cost of the installation scarcely reaches one-tenth of the outlay necessitated by the old arrangement; and inasmuch as, furthermore, with this lamp the staff of attendants formerly required may practically be dispensed with altogether, every consulting physician is thereby enabled to carry out Finsen's method of treatment during his usual hours of attendance. The pressure-glass is here replaced by a disc of rock crystal, which shuts the slit or aperture through which the light of the lamp is emitted, and which for the purposes of treatment is laid upon the main seat of the disease. The patient experiences no sensation of heat at all, since at a distance of 10 centimeters from the luminous arc the average temperature does not exceed 22 degrees Centigrade. The strongly irritating effect of the actinic rays of light, to which Dr. Finsen, among others, had already called attention years ago,* manifests itself in a very striking manner in this new apparatus also; for a few minutes after they have begun to act a perfectly painless and, as the observations made in the "Finsen" Institute have shown, long-enduring erythema is brought about. The illustration opposite may serve to convey an idea of this irritating action; it is a view of the arm of a healthy man. In this case I carried out the test as follows: Black paper letters (which in the drawing† appear white) were fixed on, whereupon I caused the light of the lamp to act on that part for three minutes. Over the entire region of the skin thus illuminated a pronounced erythema formed within about two hours, which only left those main portions free which were situated below the paper letters and were not touched by the light rays, so that after the removal of the paper the word "Dermo" appeared in white letters within the erythema. While I have here especially dealt with the application of Finsen's method to the cure of lupus, it is, of course, obvious that the new lamp may in the same way be employed for other skin diseases, so long as they are at all amenable to treatment by the Finsen method. With reference to these I would call attention to the latest publications in the Zeitschrift Fuer Diaetetisch-Physikalische Therapie, by Lesser of the "Finsen" Institute, attached to the Berlin University.—St. Louis Medical and Surgical Journal, March, 1902.

*Finsen: "Das Licht als Incitament."

†There was no picture sent.

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Editor's Remark.

In so important a paper we regret that the method of procedure and the results of experiments were not more clearly stated. We judge that the column headed "Duration of Test" means the length of time of exposure to Finsen light, excepting in the lines marked "Observation," in which the exposure was direct sunlight for the time specified. Since these plates were to show the comparative effect of sunlight and the Finsen light upon bacteria, they should be called comparison plates, not observation plates. In no case could the effect of the treatment be discovered until after forty-eight hours. We think this was the method pursued: A number of culture plates were inoculated with a certain species of bacteria; some of these were exposed to the Finsen light, some to ordinary daylight. Exposure to Finsen light varied from one second to sixty seconds. The plates were kept for forty-eight hours at a temperature favorable for growth. Sterilized plates with a culture medium of glycerine agar were then inoculated from the exposed plates. Checking of the growth was ascertained from the change, if any, in the treated plates—the death of the colonies ascertained from the absence of growth in the inoculated, untreated plates. The number of plates treated for the various lengths of time is in no case given.

Of the colonies treated for sixty seconds with ordinary light, all were checked excepting the b. typhus abdomin and the b. anthracis, which grew. None of the colonies treated with Finsen light were for any treatment destroyed, excepting the two above species. No uniformity of results can be claimed, because after one second treatment the b. typhus abdom. was checked, whereas in plates treated for three and thirty seconds respectively there was growth; practically the same holds true for b. coli communis.

We fail to see from the table of results how the bactericidal power of the Finsen light is demonstrated. In the cases of b. tuberculosis and strepococcus pyogenes the cultures exposed to ordinary light were destroyed, while those exposed to Finsen light continued to grow. It would seem that these results ought rather to demonstrate that the therapeutic value of the Finsen light in lupus and other infections of the skin resides not so much in its bactericidal power as in its increasing the power of the phagocytes in the infected tissues.

In the April number of The Journal of the American Medical Association an article by Dr. P. C. Clemensen describes the work of Finsen and his associates. The article does not give a table of results but states that cultures of bacteria were destroyed by the Finsen light. It is therefore evident that while the results published by Dr. Kathenbracker indicate no marked bactericidal effect on plate cultures, other experimenters have obtained more favorable results. We hope to publish these in a future issue.

A Peculiar Accident.

While the therapeutic use of the static current is as a rule unattended by any danger, I desire to call attention to a rather unusual source of possible injury to female patients where a large and powerful machine is used.

In a number of instances women employ hairpins made of celluloid, the highly inflammable nature of which is well known. In the case I am about to relate the usual rule to remove all the hairpins from the hair when about to administer the crown breeze was overlooked, with the result that we had a sudden and startling pyrotechnical display not down on the program. This female patient had neglected to remove a wire pin of small size, which was unfortunately located in close proximity to a large imitation tortoise-shell pin made of celluloid, which, in a few moments after the machine was started, burst into vigorous flame, resulting in a considerable loss of hair and a severe burn of the scalp.

I am using a twelve-plate Waite & Bartlett machine, run at the rate of two hundred and fifty revolutions to the minute, and the crown piece is placed at a distance of two feet from the head. The discharge from the small metallic pin generated sufficient heat to ignite the celluloid, which, being about as inflammable as gun-cotton, burned with explosive violence.

The resulting burn to the scalp proved rather refractory to treatment, but finally yielded to the use of the ordinary remedies. Fortunately for the doctor in this case, the victim was extremely good natured and not of a nervous temperament, and continued her course of treatments with much benefit to herself.

I have used the static current for a period of six years, treating patients daily, and this is the first accident of any moment that I have had occur. Never having seen a record of such an occurrence, I thought the incident worthy of report.

C. R. Arnold, M. D.
Colorado Springs, Colo.

This paper is always glad to publish reports of work done. Experience gained from accidents is often most valuable. We wish to encourage our readers to send us reports of their failures as well as of their successes.

NEW CURE FOR CONSUMPTION.

Consumptives throughout Belgium are rejoicing over the opening of an institute at Brussels for the application of the new electric system of treatment for consumption elaborated by Dr. Francisque Crotte.

The London tuberculosis conference last year declared that the system had already cured thousands.

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NOTICE.

The April meeting of the Chicago Electro-Medical Society will be held at room 1233 Masonic Temple, corner State and Randolph streets, Tuesday evening, April 22, at 8 o'clock p. m.

MEDICAL JOURNALS.

Will you kindly place the American Electro-Therapeutic X-Ray Era upon your exchange list, and we will in turn send you our publication regularly with each issue?

CHICAGO ELECTRO-MEDICAL SOCIETY.

The tenth regular meeting of this society was held at 1233 Masonic Temple March 25 at 8 p. m. President Burdick in the chair.

Minutes of the last meeting were read and approved. Mr. Friedlander reported that the executive committee had written the officers and members of the executive committee of the Roentgen Society regarding the holding of their next meeting in Chicago, with no reply as yet. The report of the research committee on priority in X-ray therapeutics was read and approved. On motion of Professor Treadwell the secretary was instructed to correspond with other societies and with medical and scientific journals requesting revision of and additions to the report.

After some informal discussion on the effects of the X-rays, Dr. Harrison was introduced to the society and read a paper entitled "Electrical Characteristics of the Circulation of the Blood." The paper was discussed by Professor Treadwell, Drs. Hall, Burdick and Pratt.

Dr. Pratt exhibited a new X-ray screen for the protection of both patient and operator.

Messrs. Frank S. Betz and John McIntosh were elected associate members. T. P. HALL,
Secretary.

Report of a paper given by Dr. Harrison at the last meeting of the Electro-Medical Society concerning the circulation of the Blood:

The paper is not available for publication in full. Dr. Harrison first mentioned the well-known facts concerning the quantity of blood in the human body, its velocity in the aorta, the small size of the capillaries, the slow velocity of the blood through these, the more rapid flow after the blood enters the veins and the increased velocity in the larger veins. He then argued that the force of the heart was not sufficient to produce motion of the blood throughout the entire system of blood vessels, especially since the velocity of the blood differs in the arteries, veins, and capillaries. Since the pulse-beat is not present in the capillaries, the heart's impulse does not produce the motion of the blood in the veins, in some of which the blood flows opposed to gravitation. To explain these difficulties he invokes the aid of electric attraction and repulsion.

He claims that the oxygen present in the arterial blood makes it positively charged, while carbon dioxide makes the venous blood negative. The heart being positively charged repels the arterial blood while it attracts the negatively charged venous blood. The paper also dwelt at some length on the relative velocity of the pulse wave in the artery and of the blood, claiming that the difference cannot be explained without the aid of electricity.

The paper was thickly overlaid with metaphysical speculation as to the essence of life-force in the cell as well as in the aggregate of cells, the individual.

The society assailed this metaphysical view as inappropriate in a scientific paper. Drs. Hall, Burdick, and Freeman, and Prof. Treadwell took part in the criti-

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cism of the paper. Dr. Hall stated that the so-called difficulties were entirely unknown to him; that on the contrary all the facts were fully explained without the aid of electricity; that it was absurd to imagine the heart positively charged when the blood is a conductor that would dissipate the charge; that arterial expansion could not be produced by a static charge. Dr. Burdick characterized the paper as short on facts, long on speculation, which is always unprofitable.

Dr. Pratt held that the paper was not without merit, though he did not agree with it in all its details. He stated that oxygen carries a negative charge, a direct contradiction to the paper. He then proceeded to explain his ideas as to how electrical forces act in the circulation of the blood. These views will be considered more in detail at a future meeting of the society.

X-RAYS IN DIAGNOSING PULMONARY TUBERCULOSIS.

The following extract we take from the New York Medical Journal of March 1, 1902, in a paper on the early diagnosis and treatment of pulmonary tuberculosis. The writer, Dr. Stubbert, has had a wide experience in the Loomis Sanitarium of Liberty, N. Y.

He proves from statistics that the percentage of cures is much higher for incipient cases than in advanced stages. Hence arises the need for accuracy in early diagnosis. He mentions the well-known symptoms of the early stages, such as loss of weight, slight rise in afternoon or evening temperature, hoarseness, rapid pulse. Rarely are all these symptoms present. He mentions an astonishing fact that in thirty-four cases of incipient tuberculosis fifteen showed bacilli in the sputum, while nineteen were negative at the time of diagnosis and subsequently. Hence he concludes that the failure to find the tubercular bacilli does not prove the absence of disease. He says that tuberculin often fails to cause a reaction and that examination of the blood is often of little value. He then speaks of the diagnostic value of the X-ray and from him we quote:

Having exhausted all the methods of examination mentioned without arriving at a positive conclusion, we are fortunate in having at our command in the Roentgen rays a further diagnostic agent of great value, especially in uncertain or incipient forms of tuberculosis. Opponents of this method of diagnosis have alleged that it would give us no information other than that attainable by other methods of examination, especially auscultation, and that, therefore, it was simply a corroborative agent. It is now nearly five years since the writer published a series of seventy-three cases showing, in parallel columns, the absolute harmony existing between the fluoroscopic examination and ordinary physical examination in pulmonary tuberculosis. The belief that the X-ray shows its greatest value in surgical cases only is fast giving way before the vast amount of accumulating evidence that it can be of even greater assistance in the field of medicine. It is true that, generally speaking, the X-rays are valuable in corroborating signs discovered by auscultation and percussion, but at times we can discover by their aid incipient lesions or small isolated foci of infection not recognizable by ordinary methods of examination. In addition the fluoroscope enables us to recognize more fully and accurately the degree, position, and relation of areas of infiltration and consolidation, and also delineate plainly the limits of these areas.

Method of Examination.

A certain amount of practice and a primary knowledge of the fluoroscope picture of a normal thorax are requisite for the successful use of the fluoroscope. The thinner the subject the more immediate and easy the diagnosis. In all subjects one has (as does the tyro with the ophthalmoscope) to look for nothing until he can see something. The patient stands with his back to the Crookes tube, immediately in front of it.

The proper distance between the tube and the patient is generally conceded to be about one inch, which would ordinarily mean a distance of twelve inches between the tube and the screen; the light should be placed in line with the spinal scapulæ and the spinal column. The fluoroscope is applied firmly and evenly to the bared chest, and the two clavicles having been located, their relative distinctness of outline will gradually indicate the site which is involved. Having examined the apices, the fluoroscope is passed up and down the whole thoracic region in search of other foci of infection.

The Normal Chest.

In about 50 per cent of normal chests the right apex is not quite so clear as that on the left side, the normal lung is more transparent, and the reflex is brighter at the end of inspiration. The ribs are more clearly defined during inspiration, and in a healthy chest an evenly clear transmission of light is visible between them. Slight shadows are cast by the deltoid muscle at the outer borders of the apices. The heart and portions of the aorta are distinguished as a dark shadow, extending from the first rib to the seventh interspace, and broader below than above. A small portion of the aorta is seen as a light shadow in the first interspace, slightly to the left of the sternum. The shadow of the heart is generally black, except on the right in the fourth and fifth interspaces, where the shadow cast is of less density; very often the cardiac impulse is distinctly visible; the apex of the heart appears to be invaginated during systole. The action of the diaphragm is well defined and during the act of inspiration it assumes a dome-like outline. In stout patients it is much more difficult to discern the outline of the ribs than in thinner subjects, and the effort required in diagnosis is relatively greater.

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In very incipient cases, where the pathological condition consists of very slight infiltration, the picture thrown upon the fluoroscope is as follows: There is a haziness or fog between the light and the observer, or the clavicle may, in other instances, appear to have a gauzy veil thrown over it.

Very often, when there is only a suspicion of any physical signs at an apex, there may be present enough infiltration to give us instead of the slight haziness or fog spoken of, a light shadow, the ribs become more indistinct, and finally the lower border of the light shades off into a haze, which gradually fades away into the normal reflex. At times, even in normal chests, there may be a slightly thickened pleura on each side, giving a hazy appearance or even a light shadow, and again, as often occurs with physical signs in incipient cases, we are at a loss to interpret the exact meaning of what we see. Allow the patient to take a deep inspiration, and if there is a slight tuberculous infiltration at one apex or the other, the haze or shadow on the unaffected side will become less apparent, while that on the diseased side remains the same. One writer on this subject has maintained that the haziness with an infiltrated apex may be simulated by emphysema and that forced inspiration will cause the haze to disappear entirely. This, it will be seen, does not occur where the haziness is due to infiltration.

Again, suppose we see a shadow due to slightly thickened pleura at one apex instead of a haze of infiltration; when we remember that nearly all sharply defined spots of pleuritic thickening cover an underlying tuberculous condition, we again have strong presumptive evidence that we are dealing with incipient tuberculosis. Now, let us move the fluoroscope down the chest and we may discover a few small isolated foci of infiltration, or, again, we may find a generally spotted lung, these spots being due to the presence of tuberculosis foci, none of which are large enough or close enough together to give rise to physical signs.

Again, we find that, as in inspection and in auscultation in most cases of incipient disease, the signs are more apparent posteriorly than anteriorly. Now, by placing the fluoroscope directly over the spinal column, the apices are brought simultaneously into the field of vision, a result impossible to obtain in front without a screen. Here let me say that it is very important not to remove the eyes from the instrument while sliding it over the chest, lest by so doing the fine points of comparison be lost by submitting the retina to a different character of light. The force of this remark will be appreciated when we remember that one often has to gaze into the fluoroscope some length of time before the landmarks of the chest are seen. Ordinarily by these simple methods a practiced eye can clearly distinguish areas of the most incipient infiltration, sometimes before abnormal sounds are heard on auscultation or percussion, and very often before their presence has been suspected. Often when examining a lung known to be diseased, we find an unsuspected focus of infection at the opposite apex. I have found foci of disease in the lower portion of the lungs in a number of cases under treatment for apical disease. In some instances these spots cleared up, in other auscultatory signs subsequently developed.

We now come to a more accurate and almost invaluable test, as far as my observation has gone, in diagnosticating a very incipient tuberculous deposit in one lung, especially at the apex, namely, a more or less restricted action of the diaphragm. Being acquainted with the distance of the normal excursion of the diaphragm on either side, it is very easy to recognize the least restricted movement of these muscles, and in every incipient case of tuberculosis, no matter how indefinite the signs may be at the apex, there is more or less restricted excursion of the diaphragm on that side.

A moment ago I referred to the spotted lung. We all know how often cases come under our notice in which the physical signs are indefinite or positively negative, and in which all the rational symptoms of miliary tuberculosis are rapidly developed. I do not mean to say that even if we were able to diagnosticate this unfortunate form of the disease before the rational symptoms appeared its fatal career could be checked; nevertheless it would be gratifying to the physician and friends of the patient to at least make the effort, and it does not seem reasonable to assume that if this unfortunate condition could be discovered before great activity was present, there would be much more hope of arresting its progress.

The paper then outlines the proper treatment in early stages, first exposing the fallacy that a high altitude is necessary; advocating in anæmia the use of arsenic and iron in congested bronchials the use of hot-air inhalations. He believes hydrotherapy is a great aid. He commends antitubercule serum to reinforce the phagocytic powers of the blood. He regards the proper regulation of diet and out-of-door life as very important. In closing he refers without comment to the experimental treatment by the X-rays, a treatment in which many readers of this journal have much confidence.

We feel that the X-ray therapeutist needs a thorough knowledge of the fluoroscopic image of the normal and diseased thorax. A few statements in regard to the technique of the examination will be of value.

In order to obtain differentiation of tissue a relatively low vacuum tube is necessary, but the rays from such a tube are not penetrative. A high tube sends out rays that will penetrate the thorax, but such rays will be of little value in detecting small changes in lung

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tissue. A medium tube must be chosen, and this must be so powerfully excited that the rays will be sent through the chest. If a static machine be used and the rays cannot be sent through a chest of medium thickness, it is a sure indication that the machine should be driven faster. The makers of any static machine will inform their customers the danger limit of speed. A similar weakness in the rays of a tube excited by an induction coil indicate that the primary current must be increased. A most important remark in the paper is that the eyes must be trained to recognize the smallest differences from the normal fluoroscopic image of the chest.

The first faculty meeting of the Chicago College of X-Ray and Electro-Therapeutics took the form of a banquet provided by the president, Dr. Pratt, for the members of the faculty and a few invited guests; followed by addresses regarding the work of the college. A free hospital and clinic will be established in connection with the college for X-ray and electrical treatment, Mr. Frank S. Betz will furnish a full electrical equipment free of charge.

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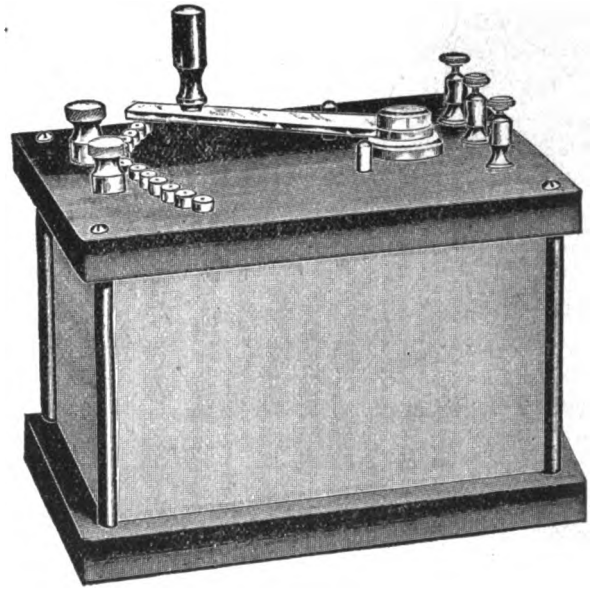
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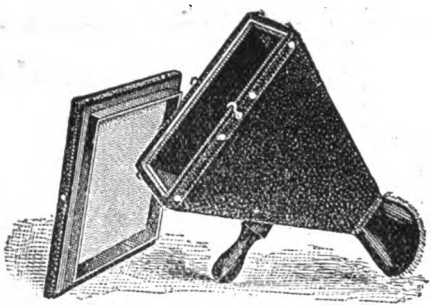
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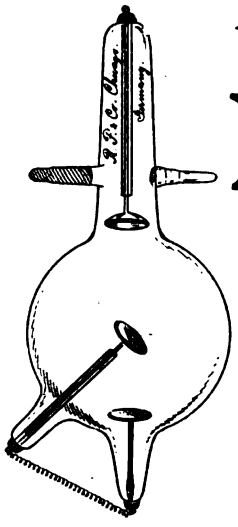
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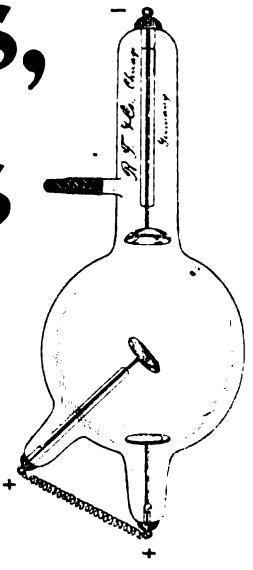
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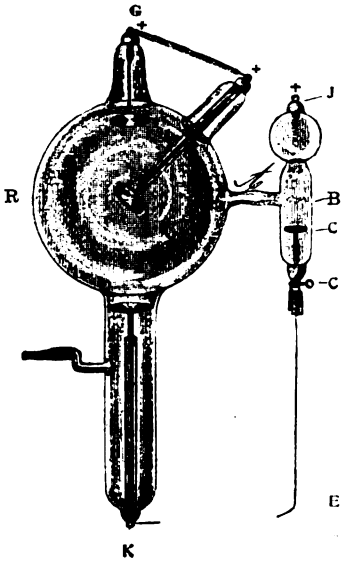
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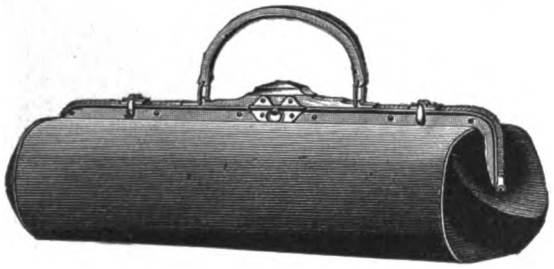
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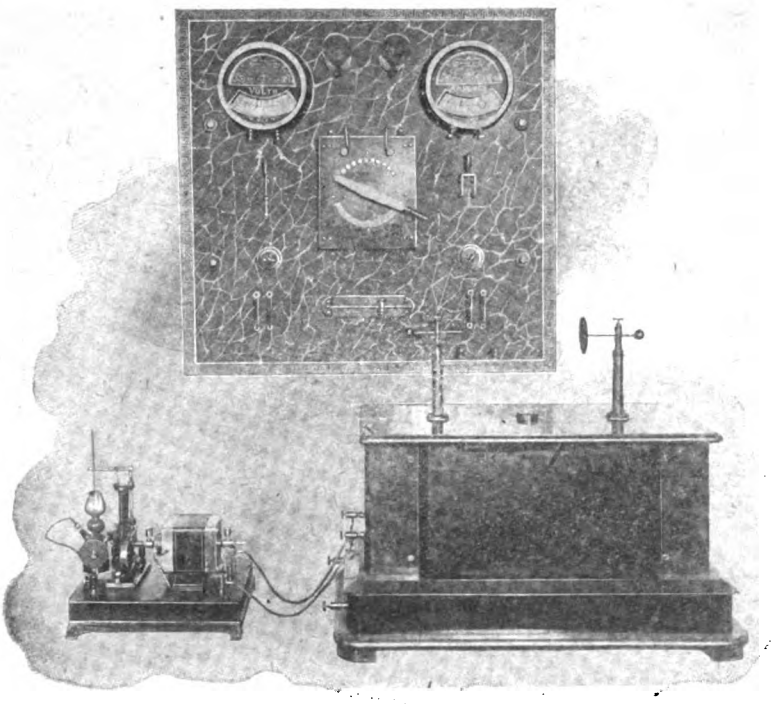
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VOL. II. CHICAGO, MAY, 1902. No. 5.

AN ESTIMATE OF THE VALUE OF THE X-RAY.

Frank H. Blackmarr, B. S., M. D.*

Like other physicians provided with X-ray machines, I early became engaged in experimental treatment with the newly discovered agent. In some of the cases I have been successful and at this date I regard unlikely any return of the disease. On the other hand I have not succeeded in obtaining a cure in all conditions under treatment but have never failed in obtaining mitigation of distressing symptoms.

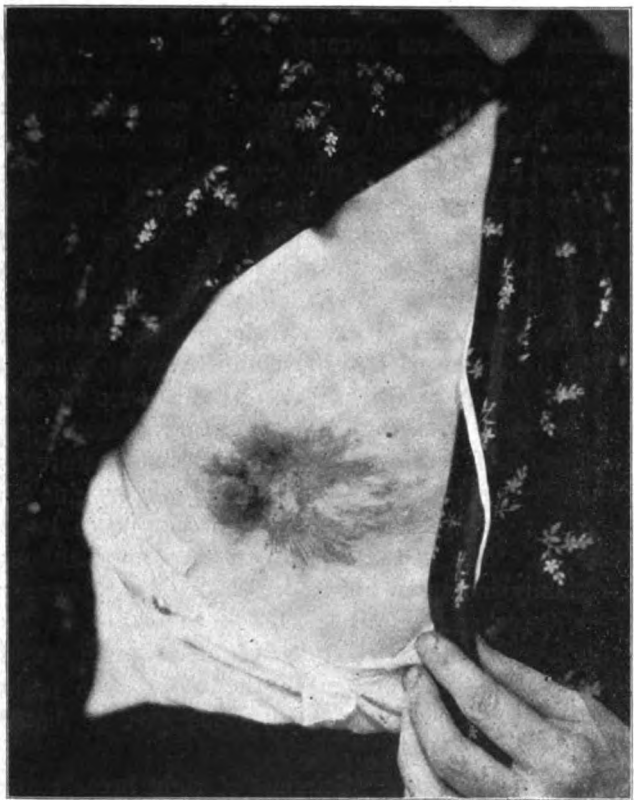


FIG. 1.

I shall limit my report to the treatment of malignant and non-malignant neoplasms, reserving for future discussion my experience in lupus and other tuberculous affections.

One of the earliest cases was an epithelioma of the face. The patient, Mr. S., presented for examination a characteristic growth. The external cartilage of the right nostril had been eaten away; the septum of the nose was about to be invaded. The superior maxillary had been destroyed from the inner part of the right orbit to the roots of the right lateral and canine teeth, exposing at least one-quarter inch of the roots. The cartilaginous tissues were destroyed, allowing a free passage way to the pharnyx large enough for the insertion of two fingers. The discharge was profuse and purulent. The tear duct had been destroyed, causing the tears to overflow the lower lid, which was much inflamed as if already invaded. Patient naturally of robust constitution; occupation, farmer; now weakened by absorption of pus. My diagnosis of epithelioma was concurred in by Dr. Howard Chislett and by Dr. F. C. Arter, cancer specialist. I regret that no section was taken for microscopic examination.

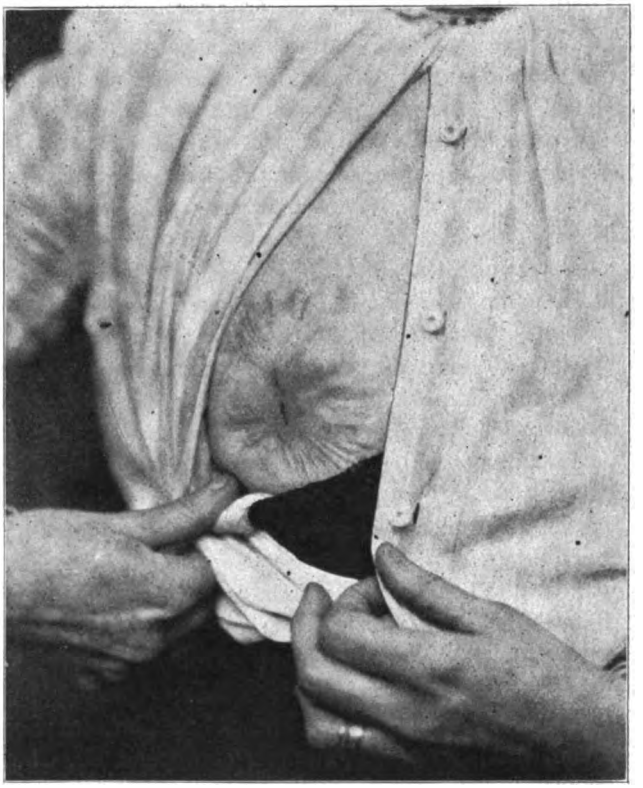


FIG. 2.

History: Growth began as a little sore at side of nose eight years ago; scab formed and was picked off; gradually the area affected increased until all the tissues mentioned above were involved.

Treatments: The normal tissues were protected by a lead mask, treatments began April 16, 1900, and were given daily with a medium tube excited by a

*Paper read at the meeting of the Chicago Electro-Medical Society, April 29th, 1902.

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static machine. Stinging pains ceased after the first few treatments; in twelve treatments the discharge had ceased, granulation had appeared, and the healthy tissue had begun to contract around the invaded parts. The patient returned to his home in the latter part of June, his health having resumed its normal tone.

In the summer of 1901 a few pieces of spongy bone about the thickness of the finger nail were sloughed from the region of the antrum. There seemed to be a portion of the bone still affected with necrosis. In July, 1901, he received a few exposures for this and has experienced no further trouble.

During treatments I kept the skin at the sunburnt stage, that is, reddened but not burned enough to produce violent inflammation. The cavity left by the destroyed bone has not been filled and never will be, although there has been some contraction at the margins of the cavity. The patient wears a celluloid patch of form and color suitable to represent the lost surface.

Since writing the above Mr. S. has returned to me, as there seems some reinvolvement of the bony structure of the antrum. I am inclined to believe that a renewal of the treatments will result as kindly as before.

Case 2. Mr. J. Epithelioma in roof of mouth. History: In the summer of 1900 patient noticed sore in socket of upper first molar, which had been extracted several years before. In November he received various treatments at home.

He came to me for examination and treatment January 29, 1901. Normal weight 210 pounds; present weight 150 pounds; occupation, farmer; sixty years of age; of large frame; much emaciated; without appetite; sleepless; hardly able to walk.

Treatments extended from January 29 to March 30 daily; X-ray in the morning, static breeze on face in the afternoon. Progress soon became evident, patient slept nearly all night, could drink water without pain for the first time in four months; could eat with less difficulty. Exposures varied in duration to avoid severe burn; they were given through the mouth, a lead mask protecting the face. On April 19 treatments were continued by Dr. S. A. Clark of South Bend, Ind., the patient's home. I append Dr. Clark's report:

"Treatments were given daily for a period of one month about ten minutes at each sitting during which time there appeared to be no perceptible effect on the growth, it advanced constantly. There was no burn produced. About this time the sub-maxillary glands began to enlarge and we gave him some treatments on the outside of his neck of about the same character as those given through the mouth and produced a very slight burn of the surface However, there was no effect on the enlargement which soon became filled with fluid which I removed by aspiration. The fluid was of serous character and gradually became less until the enlargement was entirely solid. From this time the progression of the disease was rapid and involved the hard palate, the upper teeth falling out, deglutition becoming difficult, and death occurring July 21, 1901. The X-ray would stop the pain for a period of five or six hours, this was the only effect noticed during the last two months.

Case 3. Miss M., colored: About thirty years old; carcinoma of stomach; inoperable. Exploratory incision made October 25, 1900; wound healed readily. Referred to me April 15, 1901. Emaciated, weak, being dependent on friends almost as poor as herself for food she was often without sufficient nourishment. Examination showed a hardened tumor extending from the umbilicus to the seventh rib and lying mostly to the left of the median line; very sensitive to pressure; complained of sharp, stinging pains in stomach.

After four treatments there was less pain; after two weeks an abscess formed external to the tumor; on being opened half a cup of green, gelatinous pus was removed; the cavity probably extended into the abdominal wall and only part of its contents were pressed out for fear of rupturing the peritoneum. The X-ray treatments were given daily and the wound dressed; in three days no pus was found and healing took place rapidly by granulation. By May 6 her appetite had improved remarkably and she had become strong enough to walk a little without assistance. This improvement continued until May 16 when the patient moved to a house where she was too far away to come for treatment. She took cold in moving, developed pain in kidneys with a high temperature, pus and sugar were found in the urine. From this time she lost strength continually until her death late in the fall. She had little pain in the tumor although it plainly increased in size after the X-ray treatment was discontinued.

The exposure varied from five to thirty minutes, depending on the vacuum of the tube. The patient early developed a slight burn, which gave no discomfort.

Case 4. Mrs. W. Scirrhus of right breast; diagnosis confirmed by microscopic examination. Patient refused operation. She presented good general condition. Had darting pain in the breasts but movement of arm was not impeded.

She had been treated with caustic pastes, which had removed the nipple and adjoining parts of breast. A bunch the size of a plum below the position of nipple had increased in size rapidly; the entire breast was hardened and seemed adherent to the ribs. She kindly permitted me to take a picture, which shows character of growth when she came under my care. (Fig. 1.)

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Treatments were begun July 27, 1901, and were given nearly every day until September 13, the duration varying from four to thirty minutes, the longer ones being given with tubes of high vacuum. At that time I was undecided which kind of tube would yield best results. I desired to keep the tissues in a sunburned state but did not wish to carry the exposures further.

The patient then returned to her home in Michigan. The enlargement had entirely disappeared, the breast had softened and the stinging pains had ceased. I considered that the interval of a month would determine whether further treatment was necessary. By letter I learned that the sunburn had disappeared gradually while the epidermis had come off over the parts most exposed.

In November she returned for treatment and remained two weeks, receiving in that time nineteen exposures. I again brought about the sunburned condition and although the breast was softened and she suffered no discomfort whatever I did not consider the growth eradicated.

In February the patient moved to the city and I renewed treatments, which have been continued somewhat irregularly ever since. I do not now allow a severe burn to develop, as I have come to believe that it answers no purpose in such cases as hers. I gave her short exposures, alternating with static breeze. At the present time all evidences of the tumor seem to have disappeared; she has gained perceptibly in weight and suffers no pain. (Fig. 2.)

Case 5. Mr. W. Fibroma extending from the mastoid process of the clavicle and from the angle of the jaw to the spinous processes of the cervical vertebrae. The enlargement was noticed about one year before Mr. W. came to me. Treatments were begun November 5th and were continued until December 17th, 1900. The surface became slightly reddened and the patient stated that a great change was taking place in the tumor, his health was becoming affected, he was losing appetite and sleep, the locality exposed to the X-rays felt as though bruised. On aspirating fluid resembling pus was obtained. Operation advised and performed Jan. 2d, 1901. Instead of an opening three or four inches in length to remove a tumor, an incision less than one inch long was made and the material curetted out. Report of microscopical examination follows: "Inflammatory exudate with epithelial cells. I believe that the X-rays have induced in this case a local aseptic inflammatory reaction—a local leukocytosis. This material is germ free and the breaking up of the fibroma may have had its beginning in the obstruction of the circulation by this local leukocytosis." W. Henry Wilson, M. D.

Case 6, Mrs. G. Recurrent carcinoma of right axilla; the right breast had been removed and the axilla treated with caustic pastes. There was a purulent and offensive discharge. Muscles of arm atrophied, arm swollen, unable to move fingers. The photograph shows depth of cavity. The tissues of the right side of chest were hard and seemed to be fixed to the ribs. Morphine had been given every night for the agonizing pain. There was no appetite and general condition was very low.

Treatments commenced Aug. 28th and continued to Sept. 14th, 1901, with medium low tube, duration 20 minutes daily for the first week, gradually shortening in time thereafter. Improvement was observed after third treatment; circulation in the arm became better; tissues softened; discharge less and without odor. She slept without opiates. Her general condition so improved that she was able to come to my office without assistance. A slight burn was developed and no treatments were given until Sept. 29th. From that time until Nov. 13th exposures were given at irregular intervals because the patient would not venture out on inclement days. On Nov. 14th she was seized with chills and fever; arm swelled and became purple; she was at times delirious, and remained confined to her bed for several weeks. She has now begun to regain strength, has good appetite and will shortly resume treatments.

From my experience in the above cases and others not reported, I have come to the conclusion that the X-rays produce a breaking down of both malignant and non-malignant growths. The waste products are thus unloaded upon the circulatory system. I regard this as most dangerous to the patient unless he is in such vigorous health as to be able to eliminate them, a condition not likely to obtain in a cancerous patient. For this reason, if the case is operable, I advocate the removal in whole or part of the growth, treating as early as possible the region affected with the X-rays; absorption and elimination of what material is left will be vastly easier for the defective organs with which we are likely to deal.

The breaking down process should be carried on as slowly as possible after the advancement of the disease has been checked. Daily treatments with the static breeze will stimulate both secretion and excretion. In cases 2, 3 and 6 the patients improved rapidly until the waste products were in such excess that the overburdened and probably defective eliminatory processes could not get rid of them. The result was deplorable. In case 5 the breaking down of the tumor was so rapid that only a part of the toxins were absorbed before his operation. Recovery was uneventful; there has been no return of enlargement.

This breaking down process may be contrived so gradually and the eliminating powers so stimulated that I believe disastrous results may be avoided. I am therefore led to the following conclusions:

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1. Removal of the growth in whole or in part wherever possible, followed as soon as practicable by X-ray treatment.

2. Exposures of such duration as to prevent burning, thus avoiding the too rapid breaking down of growth.

3. Stimulation of secretion and excretion by the local static spray.

Discussion: Dr. Blackmarr presented Cases 1 and 4 for clinical examination. Dr. Burdick was appointed to examine Case 4. He found a very favorable condition of the breast. The photograph taken before treatment showed a rapidly growing area near the position of the nipple, and the paper stated that the entire breast was hardened and fixed to the ribs. He found that the breast was now soft and pliable. The axillary and supra clavicular glands were not enlarged. One point of the breast was still a little hardened, but he could give a most favorable prognosis. All the members of the society examined case 1.

Dr. Street commended the conservative tone of the paper. He felt that growths should be removed wherever operable. The X-ray would prevent recurrence. He considered this a vital principle in X-ray treatment. It should be emphasized by the society.

Dr. Hall asked about the length of the static treatment. Dr. Blackmarr replied that it lasted from twenty to thirty minutes applied by the static-breeze electrode to the entire right side of the chest. The patient was seated upon the insulating stool and was connected to the negative pole of the static machine; the static-breeze electrode was connected to the positive pole. The electrode was placed at a distance suitable to give a strong breeze.

Dr. Baer approved the use of the static breeze not for the direct effect on the tumor, but to encourage metabolism.

Dr. Pratt while approving the character of the work objected to the reasons assigned for the beneficial effects of the X-ray. As to signs of improvement in the early course of the treatment he stated that as long as a tumor is adherent or immovable the treatment has not produced much effect but when the tumor becomes movable we may expect further improvement. He preferred to regard all these favorable changes as due simply to the liberation of ozone in the tissues which would inevitably produce a disintegration of the neoplasms and embryonic cells. Stimulation must be caused by the liberation of an active element which would produce chemical changes. When the X-ray passes through healthy tissue the ozone generated in the tissue produces the deep-seated burn when the exposure is too long.

Dr. Pratt stated that a friend of his had taken a section from Mr. S. and had found the tuberculous bacillus. He was treating a case very similar to Mr. S., both as to locality and involvement of tissues. It had been pronounced lupus.

Dr. Blackmarr said he would be much interested to learn of a bacteriological examination. However, both Dr. Chislett and Dr. Artie had pronounced the case epithelioma. A tubercular infection might easily have been introduced into a surface sore; the character of the cells as well as the bacilla present must be taken into account. In all suppurating epitheliomas and carcinomas the pyogenic bacteria are present, though these are not the cause of the malignant growths. Why could not the same hold with other bacteria?

Dr. Burdick said that a diagnosis by a competent surgeon could be relied upon in most cases. It was often a great expense to have sections examined and the physician could hardly afford this when his patient is a clinical case. He had cured three cases with KI which had been pronounced by a competent bacteriologist as carcinoma. As an experiment he had taken sections from a normal rabbit's eye and from several such normal tissues rarely met. These had been pronounced malignant. He had a case of abscess of the perineum which was followed by a urethral discharge. Bacteriologists found the diplocci and pronounced it a case of gonorrhoea. The patient was treated with the usual remedies and finally received an operation; neither the abscess nor the wound would heal. The patient had been losing weight and had afternoon temperature. Another test revealed the tuberculous bacillus. As an experiment X-ray treatment was given. After three exposures the discharge ceased, the wound began to heal, the temperature became normal and the patient soon regained his usual weight.

Dr. Burdick stated that every case treated had received some benefit, but this was not permanent in all cases. Improvement in the symptoms usually occurred in the following order: First, the pain ceased; second, the discharge decreased in carcinomas and epitheliomas and the tissues at the margins put on a hard, glazed appearance; third, the odor ceased after eighteen or twenty treatments; fourth, in three or four weeks there was a decided cell proliferation, an attempt to bridge over the gap of the former ulcerating crater. The central part of the ulcer may show great reluctance to granulation. Frequently new ulcerations would start in the new tissue, but these would yield to X-ray treatment. During the entire treatment there would be no suspicion of burn.

Dr. Burdick went on to speak of X-ray burns. He had read reports where operators had advised burning the involved and surrounding tissues. A reply to letters of inquiry disclosed the fact that they meant to bring on a dermatitis. An X-ray burn is no joke. The tissues showing complete necrosis shrivel up and

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drop out. He had seen pieces of flesh slough off six or eight inches in width and two or three inches in depth. These burns were produced by exposures long and intense. The burn began to develop in two or three weeks. He had seen a microscopic section of an ankle joint which had been burned three years before. The cellular structure seemed altogether changed; the bone was in a petrosed condition.

In commenting on Dr. Blackmarr's statement that a high tube seemed to stimulate the patient, Dr. Burdick said he had found that colonies of bacteria would flourish on this kind of ray more luxuriously than in an incubator. He regarded the high tube as very unsuitable in all cases of tuberculous infection.

The experimental stage in X-ray treatment had been passed. Physicians must not try to find what the X-ray alone will do. On the contrary all efforts must be made to cure the patient. The X-ray operator must see that the patient has the right constitutional treatment. A patient had been treated for several weeks by Dr. Burdick and had shown little or no improvement. The patient was sleepless and could not assimilate nourishment. The attending physician had insisted on treating solely with the X-ray. After seven weeks Dr. Burdick became convinced that the treatment would result in failure and refused to go on with the treatment unless he should be allowed to give the needed medicinal treatment. Permission being given, aromatic cascara was administered and the X-ray treatments continued. A prompt cure resulted.

Constipation frequently develops during X-ray treatment of tuberculosis. This must be removed before the treatments can be continued. Cachexia will develop in carcinoma from secretions in the involved tissues.

Editors Remarks.

Dr. Blackmarr's paper will prove interesting to our readers both because of the success attending some of the cases and for the explicit history of the fatal cases. We wish to call attention to his conclusions conservatively expressed, which were warmly endorsed by the society.

In operations on carcinoma of the breast the surgeon now has to sacrific all the mammary and axillary glands on the invaded side of the chest. From reports in this and other journals we deem it not radical to claim that this is no longer necessary. Does not the X-ray treatment insure that there will be no recurrence if only a part of the breast is removed, only the glands actively involved? In epitheliomas as well, only the affected tissues need be removed. Let the X-ray therapeutist demonstrate this alone and he has rendered a great service to science.

It may be that more attention should be paid to fatal cases. Can it be shown in the experience of others as well as in Dr. Blackmarr's that a patient might improve rapidly for a time, all the secondary symptoms encouraging, when the patient would suddenly have chills and fever, the well known symptoms of retained toxins?

The X-ray forces upon the system a quantity of broken-down tissue which must be at once eliminated. If experience proves this, the physician must pay far more attention to the general health of the patient. Nourishment must be given as faithfully as in incipient cases of pulmonary tuberculosis in which the system must also eliminate toxins. The patient must be kept in the open air.

This journal would welcome reports of fatal cases from any of its readers: We shall collect and publish them in appropriate groups. We want a complete history of the cases. It is in this way that the experience of all operators may lead to a universal and definite recognition of the value and limitations of the X-ray as a therapeutic agent.

BOOK REVIEW.

We have received a copy of "The Roentgen Rays in Medical Work," by David Walsh, M. D., Edinburgh. At first glance the American worker is disappointed to see that only English apparatus is described. In consequence the hints given for the use of the apparatus will not directly apply to the apparatus already purchased, but any intelligent operator will find his apparatus working on the same principles. He does not find dogmatic directions about the length of exposure in treating various diseases nor the other points of technique, so necessary. On the other hand, it is this very absence of dogmatic statement that makes the book valuable. It means to give suggestions, and these, if intelligently followed, will lead to success, both in radiography and therapeutic work. Some of the radiographs might be more clear. Great progress has been made since the book was first written. This

Dr. Mihran K. Kassabian was appointed by Gov. Stone of Pennsylvania to represent that state at the Congress of Tuberculosis, which met in New York, May 14 and 15. He read a paper on "The Early Diagnosis of Pulmonary Tuberculosis by Means of the Roentgen Rays." The subject is of great interest to the profession at large. We hope to give his paper to our readers.

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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

NOTICE.

The May meeting of the Chicago Electro-Medical Society will be held at room 510, Masonic Temple, corner State and Randoloh streets, Tuesday evening, May 27, at 8 o'clock p. m.

MEDICAL JOURNALS.

Will you kindly place the American Electro-Therapeutic X-Ray Era upon your exchange list, and we will in turn send you our publication regularly with each issue?

CHICAGO ELECTRO-MEDICAL SOCIETY.

The eleventh regular meeting was held in room 1101 Masonic Temple, April 22, 1902; President Burdick in the chair. Minutes of the last meeting were read and approved.

The executive committee reported progress in their correspondence with the committee of the Roentgen Society of America.

The president appointed Professor C. H. Treadwell to act in place of Dr. Neiswanger on the membership committee.

E. E. Prescott, M. D., and F. H. Blackmarr, M. D., on the recommendation of the membership committee, were elected members of the society.

Dr. Blackmarr read a paper giving an account of some cases of benign and malignant growths which he had treated by the X-rays. On motion the thanks of the society were tendered to Dr. Blackmarr for his paper and for his courtesy in exhibiting his patients.

The paper was discussed by Drs. Street, Pratt, Baer, Hall, Burdick and Prof. Treadwell.

Dr. Prescott exhibited skiagraphs showing the value of photographing both sides of the body in case of suspected abnormality; also some others of interest.

Adjourned at 10:20 p. m.

T. P. HALL,
Secretary.

This issue marks the close of the first year of the Era. We have received assurance from a number of our readers, that our original articles have been of great practical value. We have also made abstracts and reprints from articles of special value in other Journals of this and foreign countries. Our readers have thus been kept in close contact with the work of the most experienced men. We are glad to state that we shall be even better prepared to publish articles in the coming year.

The papers given in the Chicago Electro-Medical Society are of a high order, and this is the official organ of that society. In adition we have been promised articles by a number of physicians from out of town.

We feel that the use of electricity as a therapeutic agent is to increase remarkably in the next decade. It is our aim to further this progress.

At the same time, we desire to state the limitations in the use of this agent. Undue hopes were at first raised in the treatment of malignant growths with the X-ray. A reaction has begun which all the conservative operators will welcome. Some of the failures will prove to be due to faculty technique. We shall endeavor to make common property a knowledge of the most successful methods of treatment.

It is with pleasure, therefore, that we inform our subscribers of the end of the year, and we hope that an early renewal of such subscriptions as have expired will add to the satisfaction afforded by the cordial letters of approval we have received during the year.

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A New Localizer for Determining the Position of Foreign Bodies in the Eye by the Roentgen Rays.

By L. Webster Fox, A. M., M. D.,

Of Philadelphia. Professor of Ophthalmology, Medico-Chirurgical College, Philadelphia, Penna.

Having experienced, in my surgical practice, much difficulty in determining the exact position of foreign bodies in the human eye by means of the Roentgen photography, I have devised a new instrument which does the work in a far more efficient manner than has heretofore been possible.

As is well known, the location of foreign bodies by means of the Roentgen rays is possible only when such bodies are either partially or completely opaque to the rays. If a photographic plate is placed in the path of the rays, the shadow of the opaque body is projected on the photographic plate, and its position is determined by means of the position of the shadow of the body, as compared with the position of the shadow of recognized parts of the body by which it is surrounded.

In a body so delicate as the eye, sunk as it is far in the orbital tissue, considerable difficulty has been experienced in determining from some finder or localizer, opaque to the Roentgen rays, placed outside of the eye, the exact position of the foreign body. In order to minimize this difficulty I have devised a localizer which comes directly in contact with the anterior half of the eye, and its geometrical shadow, thrown on the photographic plate, aids in locating a foreign body in the orbit or eyeball. This is especially so since I have formed the outside rim of the localizer of an opaque substance, so that, if care be taken, the position of the eye will be clearly determined by the geometrical shadow of the localizer. The apparent position of the foreign body will be largely affected by its distance from the photographic plate, and it is exceedingly necessary that the direction of the rays, and the position of the plate be borne in mind when interpreting from the skiagraph the exact location of the body sought for.

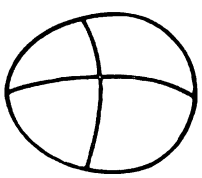


FIG. 1.



FIG. 2.

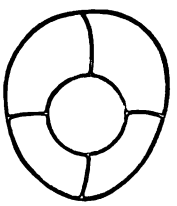


FIG. 3.

The localizing device consists of an oval band of gold or silver, about 0.75 mm. in width, so shaped and curved as to conform with the outline of the eye, and provided with two gold strands crossing in front at right angles, thus dividing the instrument into quadrants. This form of localizer is shown in Figs. 1 and 2, where the oval band and its cross-bands of wires, are placed as indicated. I sometimes form the localizer of a slightly different shape from that shown in Fig. 1. For example, as shown in Fig. 3, there are two nearly concentric bands or circles with cross-wires connected thereto, leaving, however, a round or clear space for the cornea. Generally, however, I have obtained the best results with the form shown in Fig. 1.

My latest modification of the instrument is substituting for the outer band one of lesser diameter. This device accomplishes the same localization with less shadow. The foreign body must be very minute to be eclipsed by the shadow made by this localizer.

When in use, the localizer is adjusted directly to the surface of the injured eye—a solution of cocaine having been previously applied to the conjunctiva to produce anesthesia of the cornea and eye-lids, thus permitting the instrument to remain in place long enough to have one or two skiagraphs taken without any inconvenience to the patient.

The localizer adjusts itself to the eye-ball, but does not prevent the eye, to which it is attached, from rotating or following the other eye. In order to bring the crossed wires directly over the center of the cornea of the eye to be photographed, it is necessary to direct the sound eye at a fixed point. The photographic plate being adjusted on the side of the temple nearer the injured eye, the Crookes' tube is then adjusted so that the Roentgen rays shall, as nearly as possible, fall perpendicularly on the surface of the photographic plate. If the foreign body lies within the shadow of the localizer, it must be in front of the equator of the eye-ball; its distance behind the shadow of the instrument also determines its location, either in the posterior portion of the globe or orbit. A control test by the occipito-frontal view at once identifies the quadrant in which the foreign body lies.

It will be noticed in the skiagraphic pictures shown in this article, that some outlines of the localizer are sharper or clearer than others. In all cases the clearer outlines of the localizer will indicate the position nearest the photographic plate. To a certain extent, therefore, the position of the foreign body can be judged by the sharpness of its shadow. Its absolute location may be verified by a second or control test. This test is made by placing a plate, not on the temporal side, but in front of the eye, and having the X-rays to pass through the head. This second or occipito-frontal skiagraph is not clearly outlined in detail as the first or temporal skiagraph, but with very little experience one can recognize any foreign body seen in the first test. The one defect in the temporal picture is that, if the foreign body is very small, and should lie directly below the shadow of the localizer so that it cannot be seen, then an additional temporal occipito-frontal pic-

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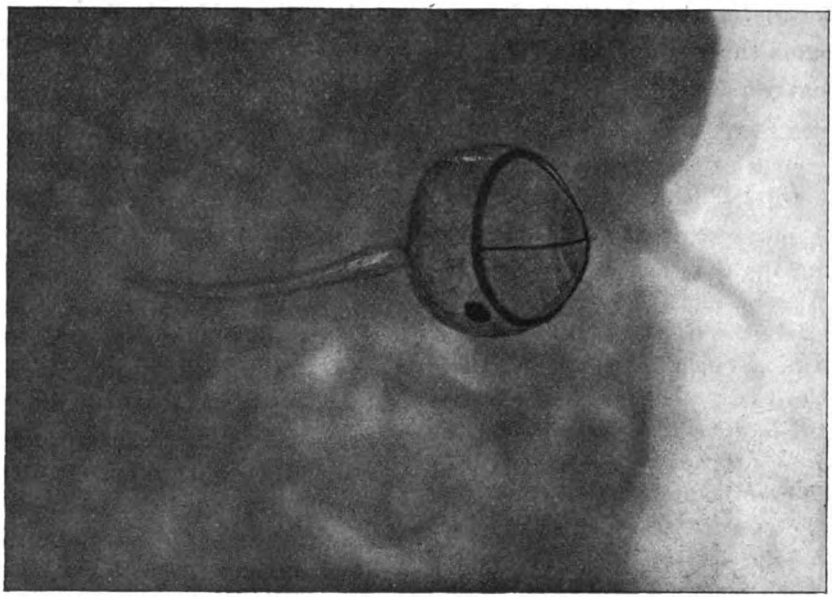


FIG. 4.

ture must be taken or an additional temporal picture must be taken with the source of the rays at a diverging angle and no longer perpendicular, as in the first instance.

Before describing the actual photographs which I have taken in the Medico-Chirurgical Hospital with this form of localizer, I will take occasion to describe, at some length, the manner in which I have diagnosed the position of the body when actually in a living eye.

For this purpose I will take Fig. 4, in which the outline of the localizer is plainly seen over a schematic eye. Immediately behind and to the lower and outer quadrant of the localizer is visible a dark object —a piece of steel. Dividing the localizer in two in its antero-posterior diameter, and doubling its distance, which would correspond to the posterior part of the eye, we would find that the foreign body would lie to the outer and lower quadrant, back of the equator, or about the equator of the eye-ball. The occipito-frontal view shows it in the lower and outer quadrant.

I will now describe skiagraphs in which I have taken both the temporal and the occipito-frontal views.

Fig. 16 is a temporal picture which shows the localizer in place, with a foreign body—a pellet of shot—2 inches behind the localizer. It is impossible from this picture to tell whether the shot is on the temporal side of the skull, or in the orbit, but it clearly does not lie in the eye-ball itself.

Fig. 17 is an occipito-frontal skiagraph from the same patient, care being taken to have the rays pass directly through the occipito-frontal part of the head, parallel with the crossed lines of the localizer. 2.5 minutes were given to this exposure. When the plate was developed the dark outline of the shot could be seen in the lower and nasal quadrant of the localizer. This would indicate the shot to the middle line of the orbit, above and near the optic nerve entrance.

Since taking the first skiagraph four years ago—eight minutes exposure—I have reduced this time to an almost instantaneous process. This eliminates a feature which was always serious in ophthalmic work, i. e., the probability of exciting conjunctivitis or dermatitis about the temple or the eye-lids and probably to the inner tunics of the eye itself.

In ophthalmic work on living subjects the time of exposure through the temple is from 5 to 10 seconds, the occipito-frontal 2 minutes and 30 seconds, with excellent skiagraphs.[1]

Mr. Davidson[2] has designed an apparatus on somewhat similar lines. He describes it as follows: "A loop of lead wire is fixed by sticking plaster to the edge of the lower lid, opposite a known point of the eye; the point of this wire, projecting upwards, forms the landmark from which the position of the foreign body is calculated. The patient is directed to gaze steadily at a distant object in an axis parallel with the plate—that is, straight in front—and two exposures are made on the same plate with the sliding bar." The foreign body is then localized from the resulting photographic records.

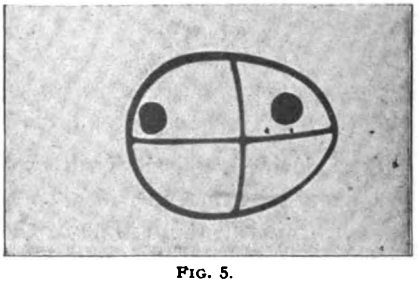


FIG. 5.

[1]For this valuable suggestion I am indebted to Prof. Edwin J. Houston.

[2]"The Roentgen Ray in Medical Work," Walsh, 1899, p. 115.

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The following experiments were made in the skiagraphic laboratory of the Medico-Chirurgical Hospital and I am greatly indebted to Dr. M. Kassabian for his assistance in making this work successful.

The Crookes tube was placed twelve to eighteen inches from the plate.

Localizer covering a freshly enucleated human eye-ball in which two shots have been buried. One shot in the upper and nasal quadrant, lying close to the ciliary bodies. Second shot, upper and temporal quadrant, in the back of the eye-ball, above and to the outer side of the macula region.

Time exposure, one-half second. (Fig. 5.)

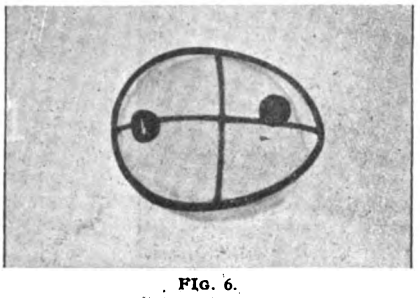


FIG. 6.

The same eye-ball with a slight change in position, giving the shot a different position from those in Fig. 5. The eye-ball being changed from one plate to another.

Time exposure, two-fifths of a second. (Fig. 6.)

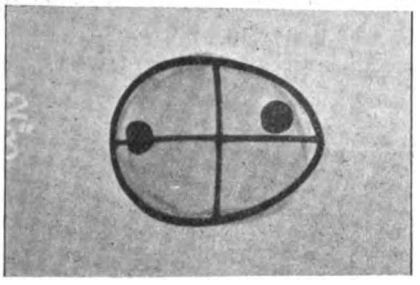


FIG. 7.

Same eye-ball changed to a third plate.

Time exposure, one-half second. (Fig. 7.)

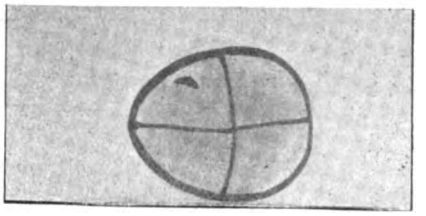


FIG. 8.

Same eye-ball with a small piece of lead, one and one half millimetres long and one-half millimetres in diameter, showing in nasal quadrant and having the same distinctness of shadow as the localizer. The foreign body was placed in the upper and inner quadrant.

Time exposure, three-quarters of a second. (Fig. 8.)

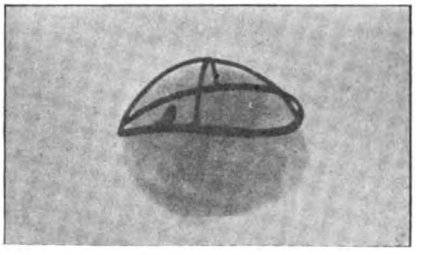


FIG. 9.

Same eye-ball placed on its side to correspond to a temporal skiagraph. The foreign body is farthest away from the plate, accounting for the loss of definition. The outer rim of the localizer, that is, the temporal side, which was resting against the plate, giving a clear shadow, which is shown in this picture.

Time exposure, three-fourths of a second. (Fig. 9.)

Dry skull—occipito-frontal skiagraph. Shot buried in the center of a human eye-ball enucleated two days previously and preserved in boroglyceride. The localizer is placed over the front of the cornea, the wires

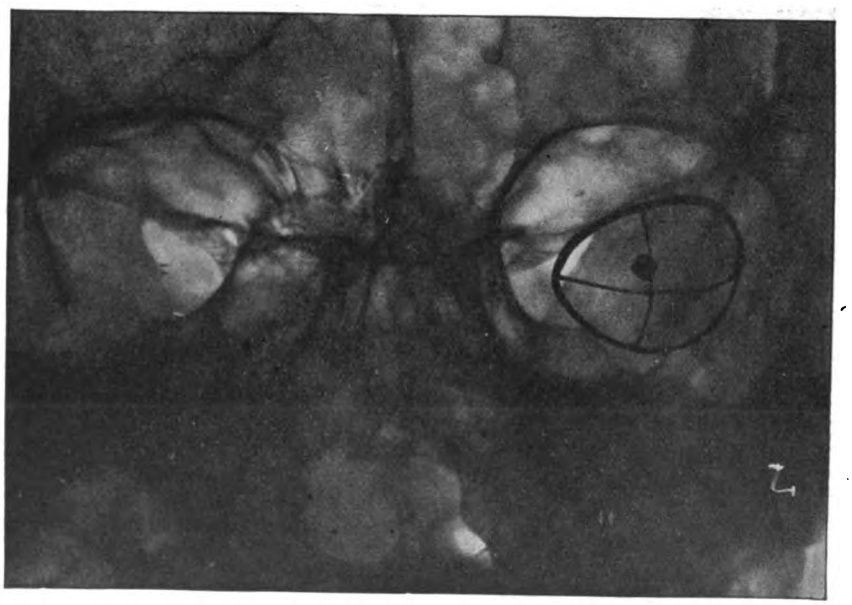


FIG. 10.

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crossing directly in its center. The eye-ball and the localizer being held in the orbital space by absorbent cotton. From the skiagraph it can be seen that the visual line was slightly turned down and out.

Time exposure, thirty seconds. (Fig. 10.)

Showing Dr. Sweet's localizer with a foreign body in the eye. It is difficult to locate this foreign body although it is plainly seen. The contrast between this and my localizer, as seen in Figs. 12 and 13, is marked. (Fig. 11.)

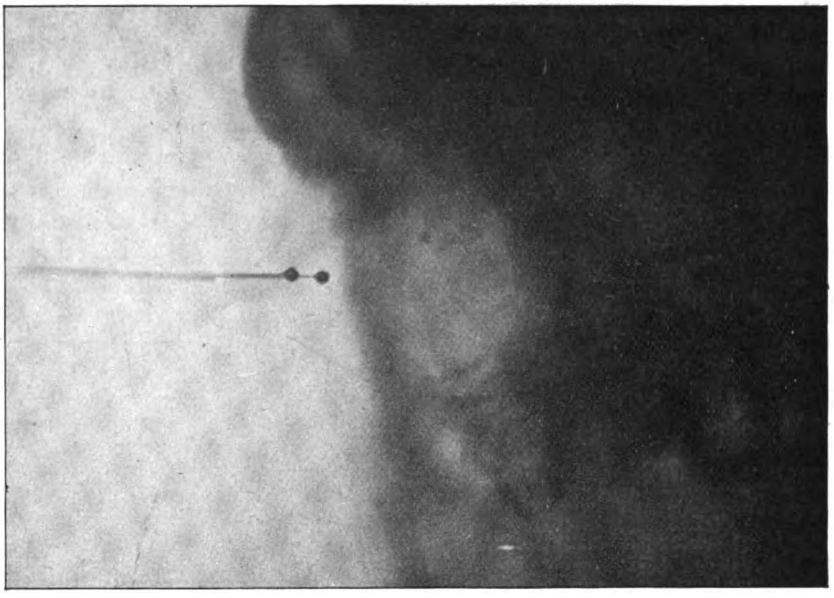


FIG. 11.

Living subject. Right eye. Localizer in its place, showing foreign body with sliver of steel, down and out, just behind the equator of the eye-ball. This was confirmed by the ophthalmoscope. The patient refused to have the eye-ball removed.

Time exposure, ten seconds. (Fig. 12.)

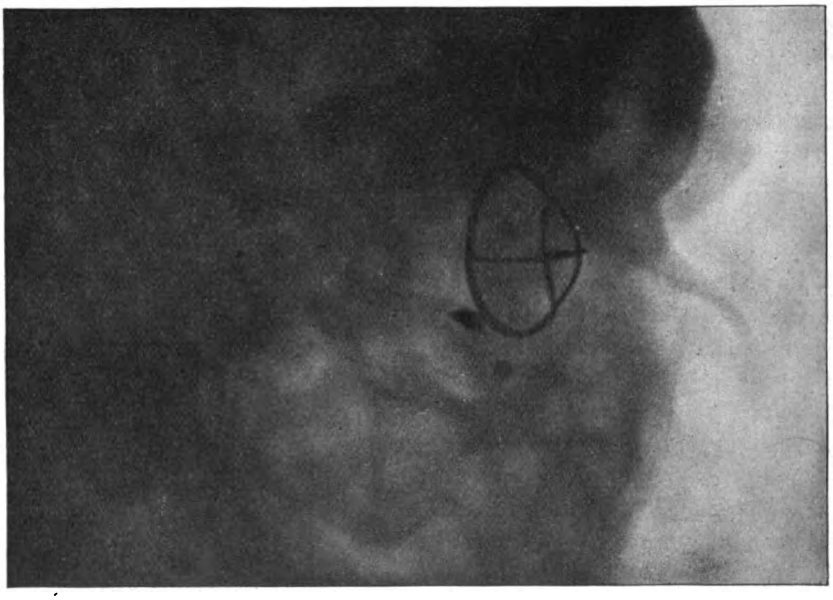


FIG. 12.

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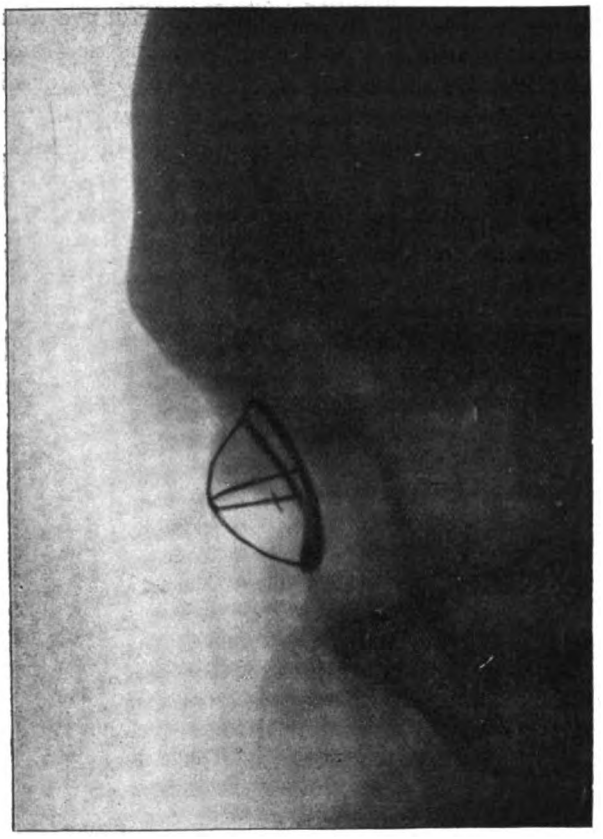


FIG. 13.

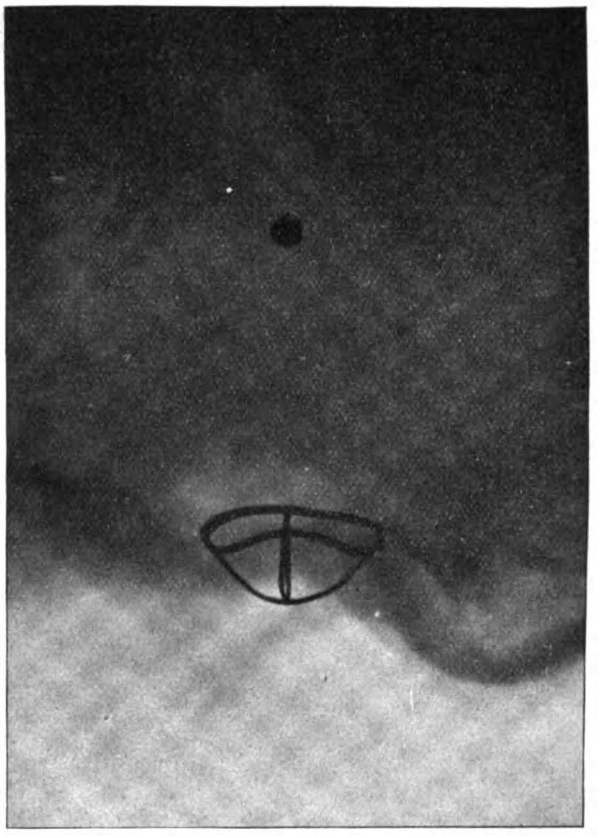


FIG. 14.

Living subject. Left eye. Localizer in place. Foreign body is crossed by the horizontal wire nearer the nose and is found back of the ciliary bodies, near the sclerotic in the horizontal meridian.

Time exposure, twenty seconds. (Fig. 13.)

The following case is an interesting one, and proves the value of the localizer, and may possibly be an exception to the above rule:

While hunting rabbits a companion shot the patient in the right side of the face, one shot penetrating the eye-ball; hemorrhage immediately followed, and the vision was obscured—practically lost; the patient could not see hand-movements in front of the eye. The eye was treated antiphlogistically by Dr. Glendon of Cedarville, N. J., his physician, for three weeks. At this time the patient was brought to me for an opinion as to whether the eye should be removed on account of the shot which was supposed to be in the eye-ball. The vision had during the previous two weeks cleared up amazingly.

I made a careful examination of the eye, and found that a shot had penetrated the sclerotic, just above the upper line of the external muscle, a short distance in front of the equator. By extreme convergence another opening could be distinctly seen on the same line, but just behind the equator, showing, by the indenture and choroidal staining, that the shot had gone in and then out through the sclerotic coat and buried itself deep back in the orbit somewhere. The wounds in the sclerotic caused by the shot having healed, the localizer was placed in position, and a temporal skiagraph taken.

From this first skiagraph (Fig 14) it was manifest that the shot was not in the eye-ball, but two inches, by exact measurement on the photographic plate, behind the crossed wires of the localizer, which were directly in front of the cornea. A second skiagraph—

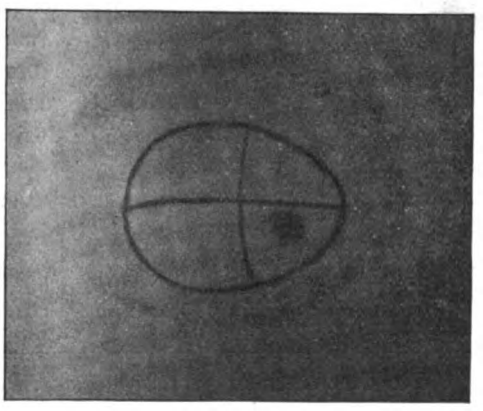


FIG. 15.

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occipito-frontal view (Fig. 15)—shows the shot buried in the orbit on a line posterior to the crossed wires in the lower and inner nasal quadrant. Taking the source of the Roentgen rays, the Crookes tube, as a fixed point, and drawing an immaginary line from it to the skiagraph in front (confirmed by the temporal skigraph), we locate the shot against the bone above and to the inner side of the optic foramen. The optic nerve barely escaped being cut in two just as it entered the foramen. Had it not been for the Roentgen rays and the localizer, in all probability a useful eye would have been sacrificed. Dr. Glendon informs me (March 13th) that the vision has improved to 20-30 for distance and he can also read ordinary newspaper type. It will be interesting to note the ultimate development of this case.

Time exposure for Fig. 14 twenty seconds.

Exposure, one minute and forty-five seconds for Fig. 15.

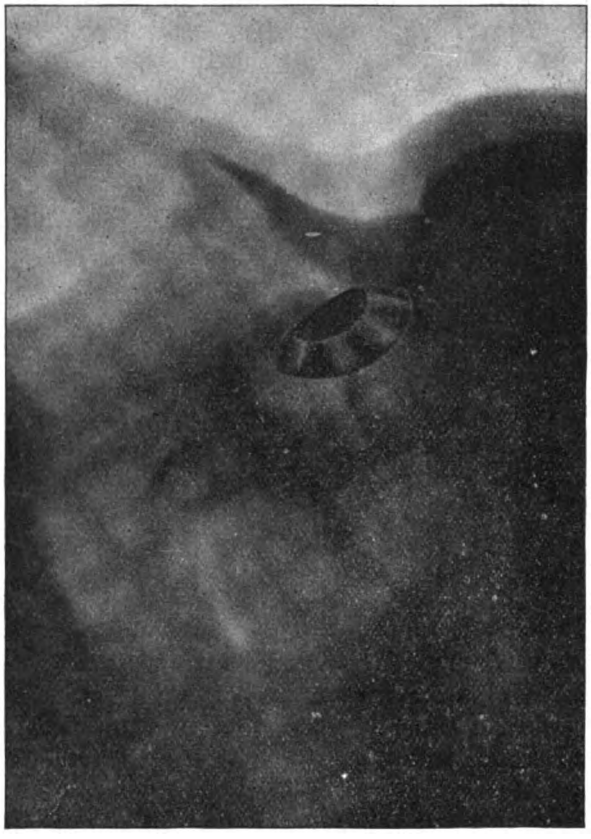


FIG. 16.

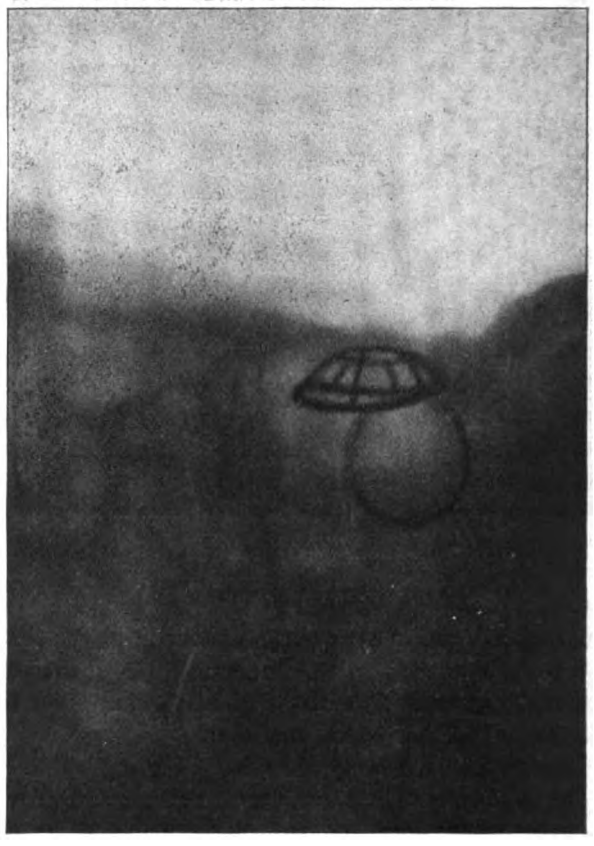


FIG. 17.

Living subject, showing an implanted glass ball in the left eye, with a gold conformer held in place by the closed eye-lids. This is a very interesting skiagraph, as it shows the conformer displaced by the action of the lids. The glass ball is situated above the horizontal plane of the conformer, yet subsequently when an artificial eye was adjusted, its position was normal and its rotation all that could be desired.

Time exposure, thirty seconds. (Fig. 16.)

Living subject, showing an implanted glass ball in the left eye with localizer. The model is different from the one now in use. The localizer covers the glass ball with the eye-lids open. (Figure 17.)

Time exposure, twenty-five seconds.

The experiments prove that we can take excellent skiagraphs on the living patient, temporal side, in five to ten seconds, and by the occipito-frontal axis in two and one-half minutes, and in the freshly enucleated eye-ball in one-half, one-fifth or two-fifths of a second. It also robs us of any risk of starting up any secondary inflammation of the eye-lids, conjunctiva or tunics of the eye-ball. Over-exposure apparently lessens clear definition of the foreign body as well as the bone structure of the orbit. The skiagraph of the dry skull with the human eye-ball buried in cotton (Fig. 10), confirms the truth of the experiments. The earlier work done in our laboratory proves this when the exposures were eight to ten minutes.

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REDUCTION OF THE VACUUM OF NON-ADJUSTABLE TUBES.

In the May issue of the Journal of Advanced Therapeutics, Dr. Clarence E. Skinner recommends baking tubes the vacuum of which has become too high. He recommends the following process:

A hot-air oven with a high-temperature thermometer for registering the degree of heat attained is necessary, and I have found from 350 to 400 degrees F. to be the most efficient temperature for this purpose. A tube that has never before been baked will usually regain its susceptibility to excitation with two hours of this treatment, but sometimes, and frequently after repeated bakings, the time will have to be prolonged to five and in some cases to ten hours.

It sometimes happens that a tube is baked too long, and when the current is run through no X-rays are produced; the violet brush discharge between the terminals (indicating too low a vacuum) appears. This can be overcome by running the current through the tube with normal polarity connections for fifteen or thirty minutes with one or two spark-gaps in the circuit. It will be observed after a little, that X-rays are appearing, and soon the tube will regain its normal efficiency.

Repeated bakings do not seem to injure the tube, and the efficiency of the procedure has not seemed, in the writer's experience, to be vitiated by repetition. One of the best tubes I ever had has been treated in this way fifteen times during the last ten months, and it is still my favorite tube for treating cancers. As far as I am able to judge, it is also just as good for skiagraphy and fluoroscopy as it ever was.

A ready method of reducing the tube vacuum is particularly valuable where a coil is used as the exciting agent, because, according to the writer's experience, a coil will put a tube out of commission by raising its vacuum beyond control, about twice as rapidly as a static machine. This is probably due to the greater amperage of the coil as compared with the static current. The greater amperage of the coil current probably also explains the greater volume of rays obtainable with this apparatus, and it is probable, further, that the greater volume of rays is responsible for the well-known increased liability to dermatitis when a coil is used.

As a rule it will be found necessary to bake a tube longer that has been used on a coil than when it has been put out of commission by a static machine, but the measure is just as effective eventually in one as the other. It should be remembered that a tube supplied with a chemical for regulating the vacuum should never be baked. Here there is no remedy but re-exhaustion, rest, or running the tube with the normal polarities reversed, and re-exhaustion, with a renewal of the chemical, is the only measure which gives much satisfaction with these tubes.

We judge that the heating and cooling of a tube must be carried on slowly to prevent the development of cracks in the glass. It should not be placed on any metallic surface, but on a block of wood or felt. A sheet iron box could be easily made by a tinsmith and could be heated by gas. The thermometer would be the only expensive part of the apparatus. Dr. Gordon G. Burdick has baked his tubes very successfully in the oven of a cook stove, the length of time varying according to the temperature of the oven, and the vacuum of the tube. In a few trials one will learn the time required. He does not use a thermometer.

In reply to a letter regarding the technique of taking the radiographs the following report was given by Dr. Mihran K. Kassabian:

A. *Temporal Skiagram.*

(1) Cocainize the injured eye, put the localizer in position by fitting it carefully under the eyelids, resting upon the cornea.

(2) Bandage a 4x5 photo plate on the temporal side of the injured eye.

(3) Patient seated on a chair, and head supported by photographer's head rest, have the patient look at a fixed point with uninjured eye directly in front on the same level.

(4) Place the Crookes' tube on uninjured temporal side distance 15-18 inches from the sensitive plate, being careful that rays passing from the *tube* to the plate do so in straight line through both eyes. I used a self-regulating tube with a 3-inch spark gap (hard tube), the means of excitation is a 15-inch *coil* with an exposure *10-15 seconds.*

I have past few years diminished the exposure from *minutes* to *seconds.* Many are yet giving as much as 5-8 minutes.

A similar exposure with a slight change in position of the tube will confirm the first one and also will prevent the eclipse of a small body by the shadow of the localizer.

This bitemporal position will show the distance posterior to corner of the foreign body.

(B) *Occipito-Frontal Skiagram* will give the location of the foreign body that is in one of the *quadrants* in which the eye is divided by the *localizer.*

(1) The patient being prepared the same as before except the (4x5) sensitive plate is bandaged in front of the injured eye, the tube being placed *8-10 inches* from the occipit, taking the same precautions. After developing these two plates and allowing to dry, put them at right angle, draw two imaginary lines from the two shadows upon the negatives, the point of intersections of those imaginary lines will be the location of the foreign body in the eye.

The article demonstrates the efficiency of the method, and in the hands of an expert the apparatus will give satisfaction. We imagine, however, that only poor results will be gained unless the operator can take a radiograph in a short exposure.

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PRINCIPLES OF X-RAY TECHNIQUE.

The wide interest taken in Dr. Grubbe's article on the essential characteristics of an X-ray tube, published in a late issue of our journal, leads us to give parts of an article published in the Journal of Experimental Medicine in 1898 dealing with X-ray technique.

The article first mentions that the focusing of the tube is very important. We wish it were stated more explicitly that it is not the X-rays that are brought to a focus. From the statements of some operators one might judge they thought the X-rays were focused. Instead the cathode rays are focused. The means taken to avoid distortion of shadows of the bones is sometimes spoken of as focusing the tube, but this process should not be so named, at least this is not what is meant by a focus tube.

The first tubes made had flat disk cathodes similar to the anodes of our modern tubes. The cathode rays fell on all parts of the glass of the tube. Every small area emitted X-rays in all directions. The radiations thus produced were necessarily feeble. Coming from so many different sources, the rays produced indistinct outlines.

A marked advance was made when the cathode was made cup-shaped or concave and the anode placed at its focus. The cathode rays fell on one small area of the anode from which the X-rays radiated outwards. Thin anodes were unable to withstand the discharge when the tube was excited by a powerful induction coil. In many cases the point of focus not only became too highly heated, but even melted, leaving a hole in the anode. In other tubes the heating of the anode lowered the vacuum of the tube, thus changing the quality of the X-rays given out and spoiling the radiograph. In order to get a pelvic or thoracic radiograph the tube must be powerfully excited. To make this possible the anodes are made of platinum disks as heavy as practicable, and special cooling devices are employed. Dr. Grubbe's article described such a tube.

Much of the paper we shall quote deals with facts and principles well known, but the restatement of these is done in a pleasing manner. We quote as follows, making a few changes where clearness demands it:

We may consider that the X-rays proceed from a single point. In looking at a skiagraph we must regard it as a complete whole, made up of the shadows of the different parts of the object. The size and shape of the shadow will depend upon three relations—the distances between the point of light, the part of the object, and the plate. Thus the distance between the light and the plate remaining the same, the farther an object is from the plate the larger will be its shadow, and the farther an object or part of an object from the base of the perpendicular from the point of light to the plane of the plate the more will its shadow be distorted, the distortion being due to elongation in the direction of a line from the base of a perpendicular through the object.

When the object is at the same time away from the plate and away from the base of the perpendicular, both of these distortions will take place. Further, since each object or part of an object contains only a certain amount of shadow-casting material, the farther it is from the plate the greater will be the size and the less the density of the shadow.

An important corollary follows from this. A picture of a less dense object may be taken through a more dense—e. g., the external ear through the skull. This can be done when the densities of the two objects are not greatly contrasted; but when one object is so dense as to be practically impenetrable to the rays its shadow will of course obliterate the shadows of anything either in front or behind it.

Another source of inaccuracy in these pictures is the fact that the rays in penetrating large objects are more or less diffused. This diffusion tends to blur the outlines of the parts of the object which are at a distance from the plate. It may also assist in making more distinct the objects in direct contact with the plate; for instance, in the picture of the external ear, taken through the skull the diffused rays from the other parts of the head may help to take the picture of the ear, because they blur all other parts of the plate which are not protected by the ear which is in close contact with the plate envelope.

It will be seen that in order to reduce these inaccuracies to a minimum the distance from the plate to the tube should be as great as possible and that from the object to the plate as short as possible. The distance, therefore, must be gauged by the intensity of the rays and convenient time of exposure. We must also remember that the wider the object or the deeper the object the greater must be the distance between the plate and the tube. For instance, the skiagraph of a hand at ten inches is very little distorted, while that of two hands side by side would be considerably distorted because the rays would strike the outer fingers at more acute angles.

A knee at ten inches, though little wider than a hand would yet be considerably distorted, for it is so thick that the parts farthest from the plate would be considerably enlarged; in a lateral radiograph of a knee, the plates being on the internal side, the external condyle of the femur would appear much larger than the internal. In order to reduce these distortions to a minimum the tube should be put as far away as is possible with a convenient time of exposure.

On the other hand, however, advantage can be taken of this distortion in taking a photograph of the patella. If the plate is put to the posterior side of the knee the shadow of the patella will be hardly, if at all, distinguishable. This would be true if the plate were on the

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anterior side and the tube far away, for the shadows of the femur would be dense enough to overshadow that of the patella. If, however, the plate be on the anterior side and the tube very near the posterios, the shadow of the femur will be broadened and diminished in density, so that the shadow of the patella, which is but little magnified and as dense as before, will be seen through it.

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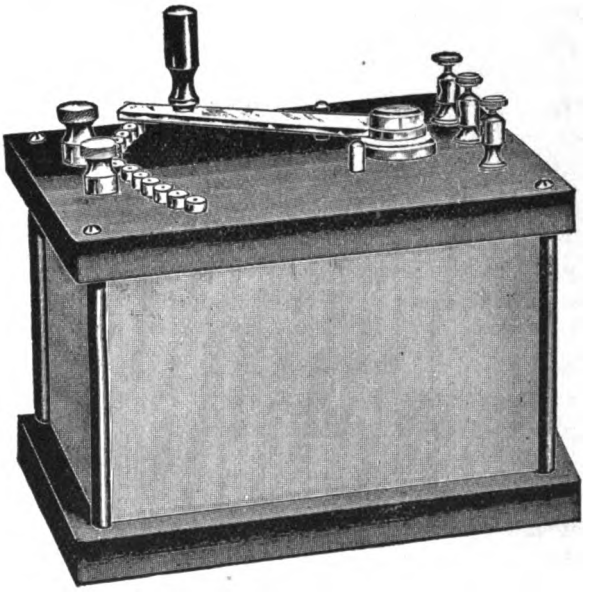
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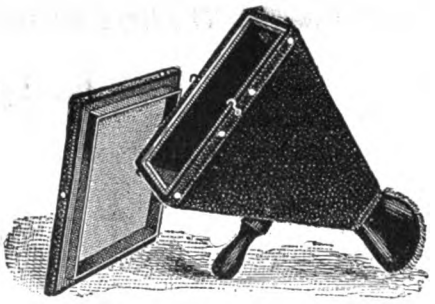
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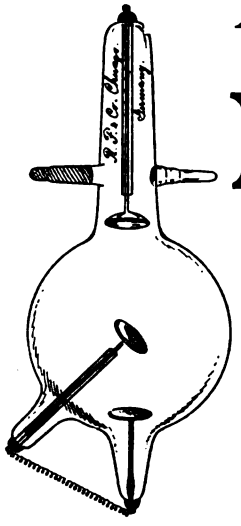
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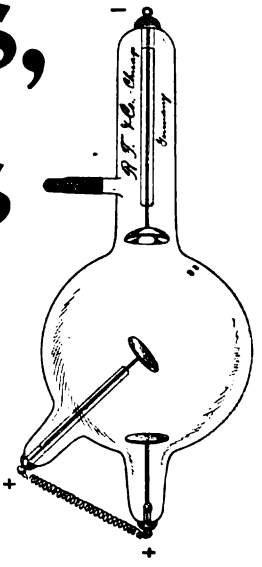
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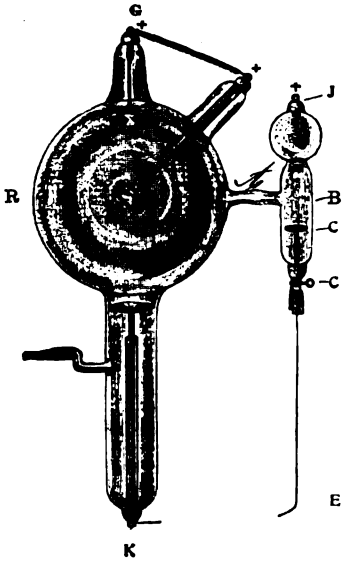


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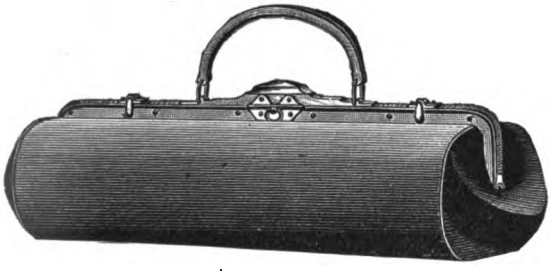
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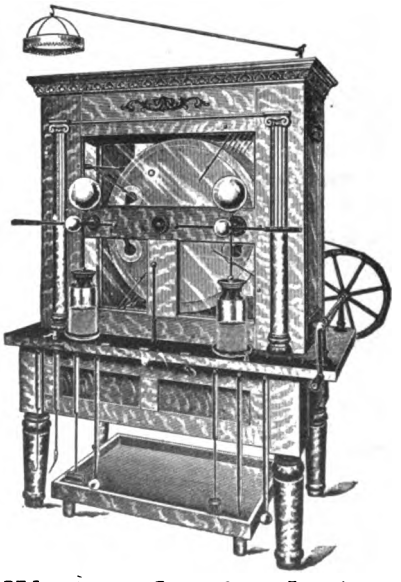
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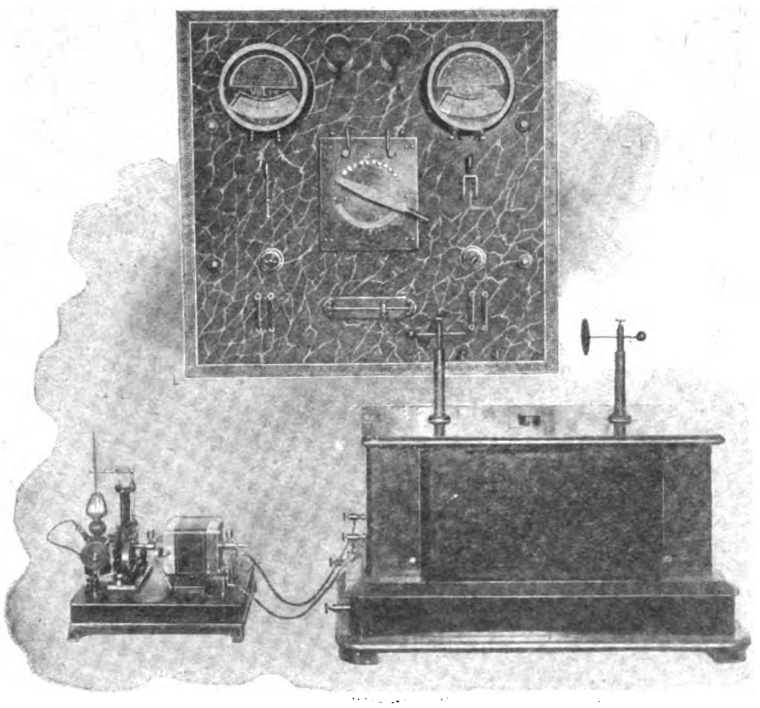
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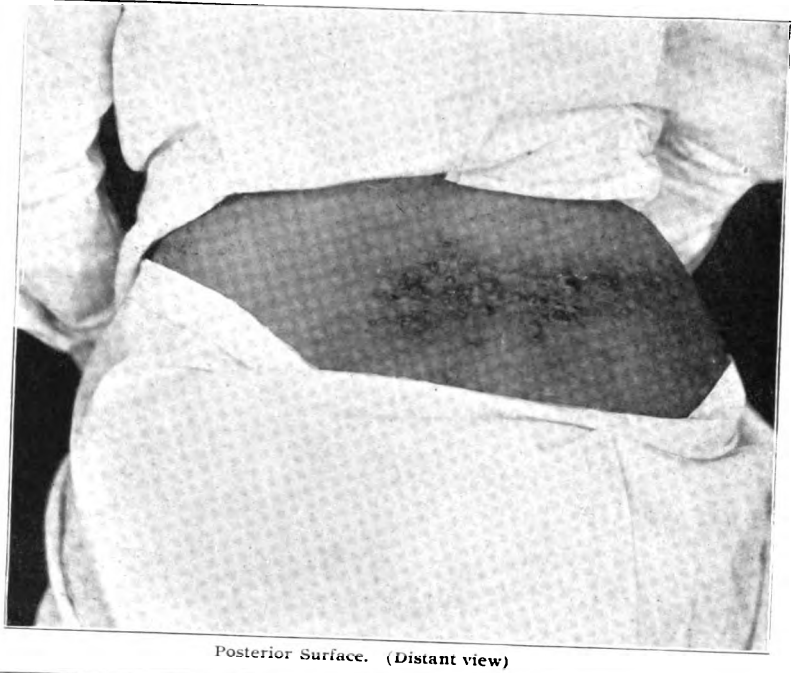
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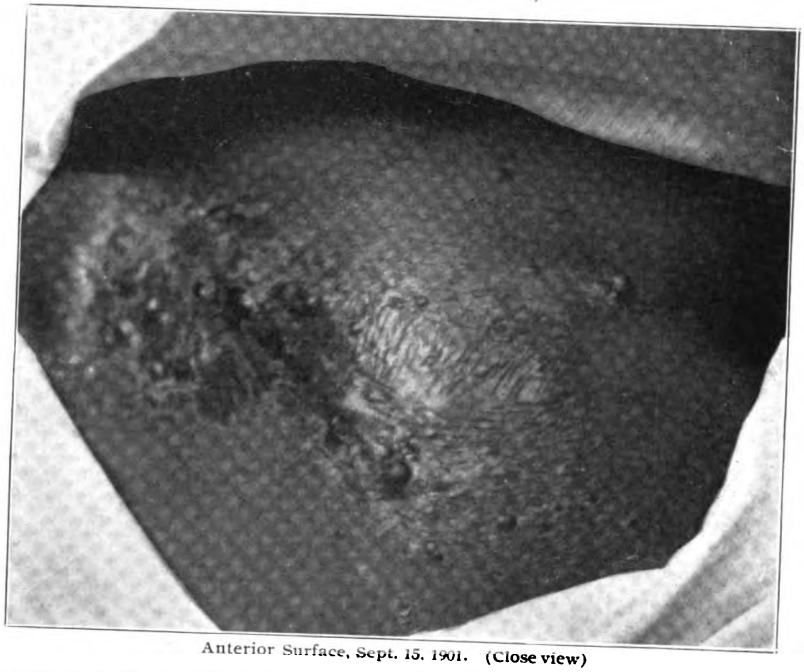
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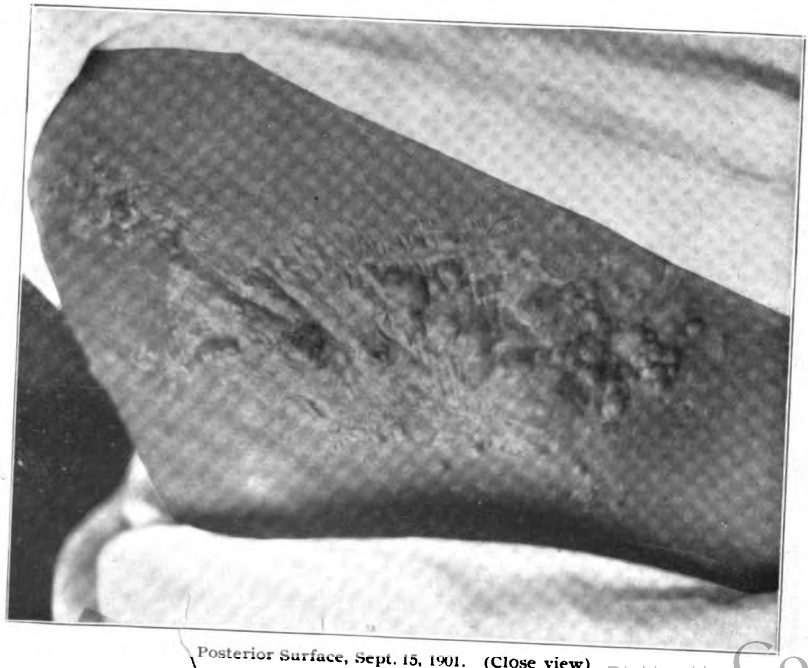
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Posterior Surface. (Distant view)



Anterior Surface, Sept. 15, 1901. (Close view)



Posterior Surface, Sept. 15, 1901. (Close view)

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AMERICAN
Electro-Therapeutic and X-Ray Era

A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, JUNE, 1902. No. 6.

A CASE OF MELANOTIC SARCOMA (MULTIPLE SARCOMA PIGMENTOSA), TREATED BY THE X-RAY.

Charles B. Morrell, M. D., Oculis et Auris Chirugas, Associate Editor International Journal of Pneumo-Therapy, Etc.*

With Three Half-Tone Illustrations.

The patient, a lady 46 years old, and well nourished, had since birth a pigmented neavus. It was situated on the waist line, about one and one-half inches from the spinal column. It was originally an inch and one-half in length and one-half that in width, and had an elevation of, possibly, three-quarters of an inch. It was almost black, with a few hairs scattered over the surface. Until the spring of 1900 it gave her no trouble. About that time it was noticed that a pinkish growth about the size and shape of a split pea had formed on the under surface of the mole, which was slightly pediculated.

This growth increased very slowly. In four months it was about as large, and very nearly the shape of a red kidney bean. It suddenly became hemorrhagic and grew much more rapidly. The hemorrhage was quite profuse and very annoying. There was no pain, but a slight burning, especially when the blood was allowed to dry on the growth.

In July, 1900, I called in Prof. Charles E. Walton, who advised an operation. The weather was intensely hot and the patient engaged in nursing a sick mother. The time slipped away until the following December, when the growth had become very annoying, the frequent hemorrhages causing alarm and great inconvenience. On December 17th Drs. Charles S. Walton and Henry Wiggers removed the growth. Upon cutting into the tissues they were found to be infiltrated for considerable distance around the growth. This infiltrated tissue was cut away and the wound dressed. It healed quite rapidly. As soon as the patient recovered from the anesthetic she complained of pain in the wound and this pain never entirely ceased until the day of her death, fourteen months after.

The patient remained in bed eleven days, getting up a little sooner than I advised, because of the sickness of her mother. On January 20th, 1901, four small growths the size of a split pea made their appearance in the healthy tissue and one somewhat larger in the wound. These growths were pinkish in color, rather hard to the touch and firmly adhered to the tissues.

A consultation was held at once, but it was decided that the growths were not malignant. The patient was put on simple treatment for a few days. At the end of a month the growths had increased in number and had changed somewhat in character. They had become quite irritable, and there was some pain. If rubbed they were prone to hemorrhage.

About this time there was slight pigmentation.

(Cut of plaster cast, showing pigmented nodules varying from the size of a pin head to a bean in an area three inches long by one inch wide.)

This cast, which was very accurately taken by the hot wax process, gives a clear idea of the growths at the end of six weeks. On March 28, 1901, another consultation was held, and it was determined to apply a 10 per cent solution of formaldyhyde to the growths. This application was exceedingly painful, but the results were, for a while, very encouraging. The growths turned a dusky brown and many of them peeled off. The patient bore the pain heroically, but it was found necessary to reduce the strength of the application to one-half. To relieve the pain, ten grains of antikamnia were given immediately after the application and this generally gave relief.

This treatment was continued a little over one month, when the pain became so severe that the patient's nervous system let down.

The older growths were considerably cut down, but new growths continued to make their appearance.

The first day of May I took the patient to New York for other counsel. Drs. Duncan L. Bulkley, William Coley, Henry M. Dearborn and others examined the case and all pronounced it a case of Melanotic Sarcoma and made a fatal prognosis. Dr. William Coley placed his serum treatment at my disposal, but did not encourage its use.

Prof. Neilson, pathologist of the New York Ophthalmic, made a careful miscroscopical examination of the old growth, which I had carefully preserved, and confirmed the diagnosis of the other physicians.

He found the round cell, the thin walled artery and the deposit of pigment in the intercellular tissue. It

*Paper read at the Meeting of the Chicago Electro Medical Society, May 27th, 1902.

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was decided that there was nothing to be done but put the patient on a narcotic and let her alone. In fact it was strongly advised that no attempt be made to remove the growth for fear of the irritation and pain.

On my return I consulted Dr. Charles Weber, with the idea of sloughing the growth, but he advised not, and we gave up hope.

After my return the growths steadily increased in number, coalesced and became very painful. The burning was intense. Every attempt to relieve the pain by the application of local anesthetics was a failure. Cocaine in varying strengths, morphine in oleate and other forms, colodium mixtures, elm bark, talcum powders, boracic acid in several forms, all failed.

I found, however, another and very valuable remedy. I use a great deal of hydro-carbol, and I experimented with it and found that this oil, with twenty grains of monobromated camphor to the ounce, gave prompt and refreshing relief. This was applied to the surface with a soft brush and was used to the day of her death. It is soft and healing and relieves the patient. She applied it herself many times a day.

In the early part of June I read in a medical journal that the X-ray had been used successfully to treat cancer. I at once took the matter up. As chance would have it, the Wagner Company of Chicago were giving an exhibition in the city. I at once went down. Drs. Hurley and Hall, who were in charge, at once invited me to a trial, and Dr. Hall gave the patient 16 treatments.

The effect was marked and very encouraging. The pain ceased almost entirely and no new growths appeared. We enthusiastically purchased a four plate mica-plate machine and X-ray tubes.

I did not know a single fact about Crooke's tubes, and my experiences were like those of all beginners. My first tube gave a purple pyrotechnical display and died. A couple more were hastily purchased. One was very high and refused to light. The other lost its heads and they could not be persuaded to stay on. A fourth proved to be a low tube and we went to work. Twelve treatments were the life of that tube and then it was punctured.

Dr. Wagner generously came to our rescue and sent us a small Monel tube that gave us nineteen treatments and then went out. I had learned a few things and I spent most of my time between treatments trying to coax the life back into the tube, but of no avail, and it hangs with the other on the retired list.

I had begun to learn something about high and low tubes, but the sarcoma was not waiting. It began to increase as soon as we discontinued the treatment.

We then concluded that a four-plate machine was not strong enough and bought an eight-plate one and some more tubes. I blundered along, alternating between hope and despair until I learned that the Chicago physicians were in the lead in X-ray work, and I took the train and went there, determined to find out what I wanted to know.

I was astounded and surprised at what I saw. I take this opportunity to thank Drs. Burdick, Blackmarr, Grubbe, Metcalf, Pratt, Mr. Friedlander and many others whose names I cannot recall for their courtesy. They gave me information that they had been years acquiring, and I came back with a definite plan in mind. I rather leaned to the use of a coil, but I returned to find that awful bugaboo, X-ray burns, in the mind of the patient, and we concluded to continue the use of the eight-plate static. Dr. Wagner put me under great obligation by agreeing to supply me with an unlimited number of low tubes and the treatments, with the exception of eight, were given with these tubes.

The eight were given with a regulating tube. The caps came off at the eighth treatment and I could never make them stay on.

The following lines were closely followed from September 26, 1901, until January 20, 1902, when the patient took to her bed, declined further treatment and died February 15, 1902:

A low tube, the rays from which show coal black bones and dusky yellow tissues. Distance, seven to twelve inches; time, twenty to thirty minutes. A lead mask covering the healthy tissues and a metal screen to stop induction.

Photographs two and three give the appearance of the case about six weeks after this new beginning.

After several treatments the patient requested that the mask be laid aside and she be allowed to stand in the light, the idea being to check the growth in the adjacent tissue. This she called her X-ray bath.

One hundred and eleven treatments were given in this manner. At first we had great hope. The tan or sunburn promptly appeared at about the fourteenth treatment, but we never got a burn again.

The treatment promptly allayed the pain, but it would reappear in about two hours. The disease gradually spread, involving the glands, and in the last month we got considerable sloughing of the older sections, but we were compelled to resort to morphine to keep the patient in any degree of comfort.

When no longer able to take the treatment the pain became so severe that the patient passed into a state of acute mania, in which she remained until within a few hours of her death.

A post-mortem was held. The external surfaces were sarcomatous almost to the bone. The liver was affected, as were the kidneys and uterus. The other organs were clean.

During the intervals of treatment and supple-

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mentary to it several other treatments were tried. I mention only the most important.

The Methelyene blue treatment. Three per cent externally and one grain three times a day internally was suggested as supplementary by Dr. Walter Metcalf of Chicago. Nothing resulted.

The extract of violet leaves in oil was tried. This application was so painful that but three applications were used. This was suggested by an English correspondent.

The nitric acid treatment on a few of the smaller growths in the early stages resulted in irritable and bleeding points that were very painful. Ergot injections also failed on one papule. In fact, nothing external or internal did any good except the X-ray.

My conclusions are these: That had the X-ray been applied to the primary growth the case would have recovered. All the counsel agreed that the disease was local, although some rather leaned to constitutional conditions. If the secondary growth had been treated in time I think that it could have been checked. I feel that the proper way to treat these cases is to push the treatment with a low tube, supplied from a coil or static machine of high voltage, with persistence. The bugaboo of burns, at least from a static machine, is no longer a terror to me. I handled all kinds of tubes for months and never was even singed. In fact, I will burn every cancer I can, and burn it promptly, protecting the adjacent tissue.

Everything leads me to feel that the case would have been saved if we had known what we know now.

I desire to thank Dr. John Booth of Cincinnati for his great kindness and the physicians who held the post-mortem, as well as numerous correspondents, who gave me advice freely and courteously, and if at any time any physician desires any particular details I shall be happy to give them any information in my power.

In this particular case the patient had a rare and malignant disease; she was not in good physical condition. She was in the menopause. The methods we used were at first crude and blundering, and yet there is enough evidence to show that the X-ray possesses great curative power. Low tubes, high tension, persistent, fearless work are in my mind the keynotes of success. CHAS. B. MORRILL.

Discussion.

Prof. Treadwell was called upon to discuss the paper. He stated that he could not altogether agree with the view that it would be wise to push the treatment with no fear of burn. Even with a static machine, severe burns have resulted. In one case, an inoperable carcinoma of the uterus, the patient was at first in constant pain; was sleepless, constipated, no appetite. At the first few treatments there was almost no improvement, but the patient came faithfully. Influenced by reports in journals at that time and by the seeming immunity of the patient to a burn, it was deemed necessary to give the treatment as powerfully as possible in order to prevent the spread of the cancer. Accordingly a medium low tube was substituted for the medium high tube and brought within six inches of the body. For several weeks marked improvement resulted, the patient sleeping without opiates, bowels active, much strength regained. She desired to go to the country for a week. On her return she showed a dermatitis, not manifested by a diffused reddening of the skin, but by a number of little nodules appearing over the abdomen. Although no severe dermatitis was expected, the X-ray treatment was not given. The patient was recommended to use Zink ointment freely and report later. In a week the nodules developed into ulcers and the entire surface of the abdomen was raw, making a burn very hard to heal. The patient felt that the tissues were burned more deeply than on the surface, but there was no deep sloughing of the muscular tissues as in some burns reported. Though examination showed that the internal carcinomatous nodules had decreased in size, there can be no doubt that the severe treatment was not necessary. In ten weeks the burn was practically healed, but the patient never regained strength to resume treatments.

In spite of the recommendations of many to burn a cancer, Mr. Treadwell stated he knew of several operators who did not think it necessary to produce even a dermatitis. If the correct rays are generated these will produce their effect independent of a burn. The fluoroscope cannot be relied upon exclusively to furnish information regarding the rays. The same tube gives out rays of different therapeutic value, depending on the generator whether a coil or static machine. Judged by the fluoroscope, the rays would be pronounced the same. It should not be understood that beneficial results cannot be obtained with a static machine, but reports of cases in the medical journals show that an increasing number of operators give treatments with the coil instead of with the static machine.

Dr. Pratt rose to agree with the paper, that it was wise to burn thoroughly every cancer, whether carcinoma or sarcoma. He had followed this method for six years. In a case of osteo-sarcoma a number of X-ray treatments were first given. The tumor was then removed. The X-ray treatments were then resumed after the healing of the wound. There has been no recurrence. The operating surgeon, Dr. Ochsner, recommends the method which resulted so well in the above case. The first course of X-ray treatments produces a partial fatty degeneration of the tumor.

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The surgical removal of this mass frees the eliminatory power of the patient from this task. The after X-ray treatments prevent recurrence.

Dr. Pratt stated he had treated a sarcoma of the eye referred by Dr. John Harper, who had first removed the tumor. The X-rays have thus far prevented recurrence. Another sarcoma was referred by Dr. Byron Robinson. The diagnosis was confirmed by the microscope. The pain had promptly subsided under X-ray treatment and the case is still improving.

Dr. Pratt objected altogether to the view of Mr. Treadwell as to the difference in X-rays. They are all of the same character. Push the primary current. A high potential tube is needed if the growth is deep seated.

Dr. Hall said that certain principles of physics would apply to the X-ray as to other forms of radiation. When direct sunlight comes through a window the glass is not warmed, but a black cloth on which the light falls will be warmed. The energy of the light waves is imparted only to the object that stops the waves. The same principle applies to the X-rays. If they pass through a tissue without absorption very little can be expected, but if stopped they will manifest their therapeutic action. If the rays come from a low tube they will be stopped at the surface and would be unsuitable for deep-seated growths.

Dr. Morrell rose to state that the very same rays he used had been successful in the treatment of an epithelioma involving the lower hip and left angle of the mouth. This case will be reported more definitely in a subsequent paper. It was treated as a control experiment to show the effect of the same kind of rays on different growths.

Dr. Burdick brought out the fact by inquiry that a spark gap was in series with the tube of a suitable length to make the tube flicker. He then went on to state that the phenomena of the tube when excited by a static machine differ very much from those in the same tube when excited by a coil. In the first place, static charges of immense difference of potential collect on the opposing electrodes to which the tube is attached, and there tends to be a neutral point between these charges when there is not resistance enough in the circuit between the electrodes. This occurs in a low tube, the resistance of which is comparatively small. In consequence X-rays are barely generated, because there are not enough ions in the tube set in motion in the cathode ray to produce X-rays of any penetrative power. The enormous speed (2,400 revolutions per minute) at which the static machine was first driven was altogether unnecessary. The same results would be obtained at a speed of 600 per minute. At the higher speed no more energy would be forced through the tube, but would be expended in electro-static effects on the terminals and connecting wires.

The penetrative power of the rays may be increased, however, by the method employed by Dr. Morrell to include a spark gap in series with the tube. This increases the resistance in the circuit, and by the greater heating of the anode by the cathode rays leads one to infer that more energy is sent through the tube because of this resistance. At any rate, the penetrative power of the rays demands a certain amount of resistance in the circuit.

With a coil, on the contrary, the resistance in the secondary circuit exerts but a small influence. A spark gap in series with the tube is unnecessary. The breaking of the current in the primary causes the magnetic lines of force to cut very rapidly the secondary helix and the potential depends upon the number of turns of the secondary wire and the number of lines cutting it per second, not on the resistance of the tube joined to the terminals of the secondary. At the successive breaks of the primary we get sharp flashes, which cause the cathode rays to powerfully bombard the anode, from which are sent out X-rays of great penetrative power, rich in photographic effect, though they would not light up the fluorescope very brightly.

Dr. Burdick stated he had experimented for fully a year, comparing effects from the same tube connected at different times with a static machine and a coil. He found that he could not radiograph an arm or leg with a low tube excited by a static machine, but with the same tube he could radiograph a hip joint when the coil was used. He had a high tube, which unfortunately was broken in moving his apparatus. This tube was so high that, though it would illuminate the fluorescope brilliantly, it would have no appreciable effect on a photographic plate, even though this was exposed for an hour directly to the rays and at a short distance from the tube.

Reverting to the difference in tubes having a similar illuminating effect on the fluoroscope, he mentioned the following fact: Every operator has several tubes which seem to possess for some reason special therapeutic value. When treating a case of osteo-sarcoma he had used different tubes, all of the same appearance, so that there could be no means of recognition by the patient. But the treatments from a certain tube seemed to give greater relief from pain. No other tube proved so effective. Being at last satisfied of this fact, after a number of other tubes had been tried, Dr. Burdick used that tube exclusively. The patient has shown marked improvement. Singularly, this tube had been exhausted to a suitable vacuum by continuous excitation on a coil.

Dr. Burdick took up the subject of sarcomatous growths. He had seen a post-mortem of a sarcoma

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involving the knee joint. The growth had been treated for four months with the X-rays and the patient had died from another cause. Examination showed that a fatty degeneration had taken place in the tumor, and those performing the post-mortem could see no reason why the degeneration would have continued had the patient lived. Another case, a supposed neuroma involving the brachial plexus, had been treated every day for five months. A slight dermatitis was apparent from each treatment. It had been growing rapidly before the treatments, but, though the tumor was inhibited, it was decided to operate. A round celled sarcoma was found in which fatty degeneration or necrosis had occurred for three-quarters of an inch. The nerves were so well patched by the operator that the patient still has some use of his arm. There has been no recurrence. Dr. Burdick stated he has been treating two cases for two years; in one the growth has decidedly diminished in size, in the other there has been no increase. In only one case has he produced irritation. He does not consider it essential to burn every cancer. He thinks it a dangerous practice, especially in the hands of the average possessor of a machine. The therapeutic effect of the rays on tissues is not due to the necrotic condition, the burn, which is a kind of white gangrene. He went on to cite the case of Otis Clapp. A physician bought a static machine with a guaranty from that firm that it would not produce a burn. During experiments on himself he was severely burned and secured heavy damages. It is not wise from the medico-legal standpoint to advocate burning.

Dr. Pratt arose to state his theory of the burn. The rays are in the nature of an electric current of high voltage which drive the disease germs in the air into the patient. These produce the formation of pus that leads to the necrotic process in the tissues invaded. Let the patient be protected with a celluloid screen and nothing more than a slight dermatitis will be produced.

Dr. Baer stated he preferred to use the electro-cautery rather than acid or the various caustic pastes on cancerous nodules. The cautery is clean and prevents hemorrhage of the nodules thus treated. Dr. Morrell heartily concurred, stating he had used the electro-cautery with success in a number of malignant growths, but felt that unless the X-ray proves of value the best thing to do with a sarcoma is to let it alone.

Dr. Burdick said that irritation simply causes a more rapid spread of the growth. In a case of supposed ostitis of the femur the radiograph had led him to suspect it a sarcoma. He advised that the leg be let alone. Instead, the surgeon in charge operated. In four weeks he had to amputate the leg; in four more weeks he amputated at the hip joint, and in two more weeks the patient died; sarcomatous growths were in the body. Dr. Burdick did not believe that a sarcoma could be removed by operation.

Dr. Morrell said he had almost come to believe that his case had become inoculated from attendance on her mother, who died at the age of 73 from an epitheloma involving the breast and shoulder. At the time of her death the growth was about thirty-five square inches. Her daughter had attended her for four years and had possibly been inoculated. At the time of the post-mortem the liver was found involved in the sarcomatous growth, but the physicians were unable to decide whether this was primary or secondary. Two years before the patient had complained of severe pain in the liver and her body became rigid. She afterward passed a black stool almost like blood. Dr. Morrell had often wondered whether that meant the beginning of the growth before it made its appearance in the naevus.

Remarks.—Although Dr. Morrell was unable to save the patient, his experience has not led him to doubt the efficiency of the X-rays. It would seem from the common experience of surgeons that a sarcoma should not receive operation, but should be given X-ray treatment in the early stages. In the later stages, when secondary growths have begun, the X-ray cannot be expected to do the impossible, but even then it is the most satisfactory agent in the relief of pain.

PROMISING METHODS OF TREATING SARCOMAS.

The endeavors of Dr. Morrell to find a subsidiary agent to the X-ray for the purpose of controlling pain leads us to bring to notice the beneficial results in the use of arsenious acid to check rapidly growing multiple sarcomas. Sherwell in the American Journal of Medical Science in '92 reported a remarkable case. Diagnosis was confirmed by microscopic section by a number of different specialists. The case was exhibited before the New York Dermatological Society.

The growth started as a tumor on the left thigh, involving the poplitial space. It was removed by the knife. Other growths after three months appeared on the right thigh, the chest, shoulders and arms. It was soon necessary to remove 30 growths from different parts of the cutaneous surface. Dr. Sherwell began treating with arsenious acid. The mixture was four parts of Fowler's to one part Donovan's solution respectively. The dose was at first eight drops of the mixture, four times per day, adding at least daily one drop to each dose until 26 or 30 drops were given four times per day. About that time the patient would show toxic effect, nervousness, hyperaesthesia, nausea. The doses were then discontinued for about two days, when the toxic effect would cease.

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Under the treatment no new growths began and all the old growths were checked, most of the tumors entirely disappearing. The patient had to return home to New Hampshire and neglected the treatment. In the course of three months the patient came to Dr. J. B. Fletcher of Burlington, Vt. The patient was covered with sarcomatous growths and was in an exhausted condition. He was put under tonic treatment for three months, his general condition improving, but the growths growing rapidly. Fully 170 were removed during this period. New ones started up rapidly. The arsenic treatment was then given and in a month all growths had disappeared excepting a few on the face and neck. At the end of another month the patient had to leave for home. He neglected treatment. The growths reappeared and he died. The paper noted the subsidance of the growths under treatment, but their early reappearance when treatments were discontinued. Dr. Sherwell cited several recurrent epithelioma, which were controlled by the same treatment. The case was never cured, but enjoyed better health for several years.

Koebner of Berlin and Funk of Warsaw have reported sarcoma cured by hypodermic injections of arsenious acid. It has gone out of use in great part. Another promising treatment is mixed toxins of erysipelas and bacillus prodigiosus.

Dr. Coley in the Vol. 17, Twentieth Century Practice of Medicine, describes the preparation of the toxins and method of treatment. A considerable number of inoperable tumors have disappeared under treatment. Although Dr. Coley did not recommend this treatment to Dr. Morrell it can hardly be due to its unqualified failure for he has published too many cases of successful results. We judge that he could not promise much in any definite case.

In our view the X-ray has been used too much as the only therapeutic agent. It has not succeeded so well with sarcomas as with epitheliomas. We would like to see the X-ray used in conjunction with Dr. Coley's toxins in treating sarcomatous growths. Those having clinical material would be justified in the experiment.

TREATMENT OF A CASE OF LUPUS.

The Journal of the Advanced Therapeutics published an interesting article of Dr. T. W. King of Bradford, Pa., on a case of lupus. The lupus patch was on the right side of the nose, extending to the canthus of the eye. A heavy tinfoil screen protected the healthy tissues. Treatments were given with a low tube excited by a static machine strong enough to make the anode a cherry red.

In reply to a letter for a more detailed report, Dr. King sent us in substance the following: Daily treatments were given without effect for seven days, 10 minutes' exposure, distance of tube 12 inches. Treatments were then lengthened to 30 minutes; result, improvement. On fifteenth day, exposure 30 minutes, distance of tube six inches. On the next day there was a rather severe lacrimation of the right eye and a bright red dermatitis of the right side of the face. Treatments were discontinued for seven days, during which time the scab fell off and revealed a healthy base. The dermatitis was treated with boric acid ointment and disappeared in seven days.

Treatments resumed on the twenty-second day, a lead screen 1-16 inch thick protecting the healthy tissues. From the twenty-second to the twenty-sixth day four treatments were given with the tube at six inches and 30 minutes' exposure. After the first of this series of four treatments there was a relapse, the healthy base gave way to foul discharges. From the twenty-sixth day to the thirtieth another series of treatments were given, tube at six inches, exposure 45 minutes, with no improvement. On the thirty-first day an hour's treatment was then given, tube at six inches. The scab dropped off and a healthy base was presented. Treatments were discontinued.

After about a month three more treatments were given to insure the permanence of the cure, though there were no signs of recurrence.

COMMENTS: Apart from the interest in the result of the treatments, our readers will note the length of the treatments in which no severe burn was produced. We have never seen a case reported in which such long treatments with a low tube were given. In 31 days 24 treatments were given. During the last nine days the treatments were daily and ranged from 30 minutes to 45 minutes, the last one being 60 minutes.

We venture to say that many patients would have been severely burned under such treatment, even though the tube was driven by a static machine, not a coil. There is a possibility that a medium tube instead of a low tube was used. The judgment of operators differs according to the age of the fluorescopic screen. The claim can hardly be made that the tube was not powerfully excited, because the statement is made that the anode was heated to cherry redness by the cathodic bombardment.

The case illustrates the fact that the dermatitis depends much on the susceptibility of the patient. It is reasonable to suppose, as well, that burning may be easier when the surface treated is larger than when comparatively small. Although operators differ as to the advisability of producing a dermatitis, some even advocating a severe burn, it must not be supposed that any one desires to produce a necrosis affecting the deep tissues.

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CASE PRESENTED BY DR. ELMER E. PRESCOTT AT THE MEETING OF THE CHICAGO ELECTRO-MEDICAL SOCIETY.

Dr. Prescott had prepared a paper but wished to defer it until the next meeting, owing to the extended discussion on Dr. Morrell's paper. Instead, he presented for examination a patient showing the effects of the X-rays on old adhesions. His report of the case was as follows:

H. S. came to me the morning of Nov. 2, 1901. He gave the following history: Aged 52; widower; no children. Cut the thumb of left hand September 13, 1901. Was admitted to Cook County Hospital September 16; remained at this institution six weeks, or until October 30th.

I operated November 3d, opening seven pus cavities in the hand, forearm, and arm, one of which was in the elbow joint. I removed a large sequestra from the lower end of the ulna, also another one from the lower inner surface of the humerus.

He was under my immediate care in my hospital for four months. After his discharge, his hand was useless. Adhesion had formed between all of the muscles of the left arm from the fingers to the shoulder. As you see the fingers are fearfully distorted.

On the first day of April of this year I anesthetized the patient, assisted by Edward Fick, a student of Rush Medical College and broke down all of the adhesions. The operation made no improvement for the adhesions soon formed again and seemed more permanent than before. During all of this time I had the patient on iodides and various forms of mercury, but all of these have failed.

Two weeks ago I began to give him X-ray treatments with a medium soft tube, the exposure lasting seven minutes, the tube being changed to various parts of the hand, arm and fore-arm.

The wounds were entirely healed at the time of the exposure. I had no hope of any benefit from the use of the X-ray, and you can imagine my surprise when after the sixth treatment he came to saying: "Look once, doctor; I can move my fingers."

I have been giving daily treatment for two weeks. The fingers are still fearfully distorted, but you can see how easily he uses them.

The wrist is still firmly ankylosed; pronation and supination is very limited. The motion at the elbow is quite perfect, but the adhesions here were only partial.

I want you to carefully examine this man; form a picture as you see him now so that you can mark the improvement when I present him one month from now.

Discussion.

Dr. Coons wanted to emphasize that the lesion could not have been bony ankylosis. The X-ray could have no effect in such cases.

Dr. Burdick said that evidently the treatment had improved the arm. Others stated their doubt of further improvement under the X-ray alone. Further reports on the case are awaited with interest.

MEETING OF THE AMERICAN ROENTGEN RAY SOCIETY.

The following notice has been sent out by the chairman of the executive committee, Weston A. Price, D. D. S., of Cleveland:

The next meeting of the American Roentgen Ray Society will be held in Chicago December 10 and 11, and promises to be the best meeting in the history of the society. A very fine program, which will be announced later, has been secured, and on it are several of the leading men of medicine and science. We will have a manufacturers' exhibit, showing the latest improvements and most approved forms of apparatus. The local preparations are in the hands of a most excellent committee, as follows:

Dr. Ralph R. Campbell, 414 Marquette building, chairman, Chicago.

Dr. John B. Murphy, Reliance building, Chicago.

Dr. Louis E. Schmidt, 424 North State street, Chicago.

Dr. M. L. Harris, 100 State street, Chicago.

Dr. W. L. Baum, 103 State street, Chicago.

Dr. H. G. Anthony, 465 Dearborn avenue, Chicago.

Dr. W. A. Pusey, Columbus Memorial building, Chicago.

For any particulars or information write to either the executive committee or the committee on arrangements.

The meeting will be one of great interest because of the wide use of the X-ray both as a diagnostic and therapeutic agent. As is well known, a number of factories making coils and static machines of national reputation are located in Chicago and the exhibit will doubtless be very fine. Chicago is so easily accessible that the attendance should be large.

We again call the attention of our old subscribers to the fact that their subscriptions may need renewal. A number have replied already and we are glad of this vote of appreciation. The use of electricity as a therapeutic agent is becoming more and more general. New methods of treatment are frequently discovered that yield favorable results. A live journal will therefore become indispensable to the progressive physician. We aim to meet this demand.

Announcement.

Our July number will contain another original and very interesting article by Charles B. Morrell, M. D., entitled: "The Adjuncts of Modern Medicine." Every medical practitioner should read it.

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R. FRIEDLANDER, - - - - Publisher.

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NOTICE.

The June meeting of the Chicago Electro-Medical Society will be held at room 510 Masonic Temple, corner State and Randolph streets, Tuesday evening, June 24th, at 8 o'clock p. m.

MEDICAL JOURNALS.

Will you kindly place the American Electro-Therapeutic X-Ray Era upon your exchange list, and we will in turn send you our publication regularly with each issue?

CHICAGO ELECTRO-MEDICAL SOCIETY.

The twelfth regular meeting of the Chicago Electro-Medical Society was held in room 510, Masonic Temple, May 27, 1902; President Burdick in the chair.

Minutes of the last meeting were read and approved.

The resignation of Dr. M. J. Seifert was read and accepted.

Arthur D. McWayne, M. E. and C. H. Upton, M. D., on the recommendation of the membership committee, were elected to membership.

On motion of Dr. H. P. Pratt the following resolution was unanimously adopted:

Whereas, the X-ray is a therapeutic agent of recognized value, and in the hands of ignorant and unskilful persons is liable to do serious injury to any one exposed thereto, and

Whereas, the professed object of an X-ray operator in exposing a subject to X-rays does not alter the effect of the rays or the dangers incurred, and

Whereas, Physicians are the only class of persons recognized by law as having the necessary knowledge and training to justify them in the therapeutic use of dangerous agents.

Therefore, It is the opinion of this society that the Medical Practice Act of the State of Illinois should be so interpreted; or if necessary so amended as to make it unlawful for any person not a legally qualified medical practitioner to expose to the X-rays, for any purpose whatever, any part of the living human body, for hire or expectation of reward.

The secretary stated that he had arranged with Mr. Friedlander, the publisher of the official journal of this society, to secure printed copies of the report of the research committee to use as directed by the society; that the publisher had given him positive assurance that the report would be published in the last issue, and that this was not done; also that the publisher now absolutely refuses to publish the said report, which formed a part of the official record of the society. Under these circumstances the instructions of the society involved an expense for printing the report, and the secretary desired further instructions. On motion of Dr. Baer the instructions given to the secretary March 25 were rescinded.

Dr. C. B. Morrell of Hyde Park, O., read a paper describing the X-ray treatment of a case of melaustic sarcoma. The paper was discussed by Prof. Treadwell, Drs. Pratt, Hall, Burdick and Baer.

Dr. Prescott exhibited a patient he was treating by X-rays for immovable joints following purulent inflammation of the arm.

T. P. HALL, Secretary.

Doctors, show your appreciation of our journal by sending us your subscriptions now.

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EDITORIAL.

At the last meeting of the State Homeopathic Association a paper on the X-rays was criticised because cases were claimed cured, when three years had not elapsed since the patient had been discharged. This should serve as a caution to X-ray enthusiasts, that they should explain what they mean by a cure. When a carcinomatious breast is removed the surgeon well knows that if any of the invaded tissue remains, the growth is sure to recur with unimpaired activity. He has done nothing to destroy the growth. He simply hopes to remove it.

The X-ray, however, has been proved to cause a degeneration of the growth itself. Gradually the invaded tissues are relieved of the cancer cells and seem to resume their normal appearance and functions. Theorists are not lacking to declare how this change has been brought about, and their theories are not without interest and merit.

This change is what the X-ray therapeutist has been calling a cure. He does not mean that there are no cancer cells remaining which may again institute a growth. Indeed, it would not be safe to make such an assertion, possibly not after three years have elapsed. One thing is certain, however, that whereas the patient is always loth to submit a second time to a surgeon, and therefore often waits until the growth has been again well established, there will be no grounds for delay in taking a second course for X-ray treatment. The X-ray operator could reasonably assure such a case of ready relief provided there had been no change for the worse in the general health.

In the above statement we do not mean to decry operations. Evidence is clear that great danger of general septicaemia is run when X-ray produces a rapid degeneration of cancer tissue. Until the method of suitably controlling this degeneration is known, operations will be necessary. The X-ray is now to be regarded simply as an aid to surgery, in cancer treatment, not as its supplanter.

INCONTINENCE OF URINE.

Dr. J. Auriol Armitage (Journal Electro-Therapeutics) writes: In answer to an inquirer's question with regard to incontinence of urine in a boy of eight years, I would suggest the use of the constant current of electricity. A large electrode applied to the lower dorsal region, which should preferably be the negative electrode, and a small positive electrode to the perineum, a current of about three milliamperes, used for about ten minutes on alternate days, will often give excellent results.

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COMMUNICATION.

Editor American Electro-Therapeutic and X-Ray Era:

Dear Sir: In your March issue occur some very good articles which, nevertheless, contain some statements I would like to criticise. Dr. Burdick, in common with many others, speaks of X-ray light as an intense light. It really is very feeble, both as regards its mechanical equivalent in terms of foot-pounds, and it is also feeble as regards its action on silver salts. Again, the doctor says that a coil forces X-rays even of long wave length (or a wave length barely visible on the screen) through the body and that this wave possesses intense chemical efficiency. If this is true it should do excellent skiagraphic work. If he claims that this would be true if it was not for the fact that but little escapes arrest in the body, I answer that a test case can be arranged. Suppose we use a tube having a resistance equivalent to 1-25 millimeter of spark in air and expose a hand over a plate at 15 inches for 1-5 of a second. Then use a tube of four inches, spark resistance under similar conditions. When the plates are developed the high lights will be blackened most in the plate exposed under the high vacuum tube! I cannot understand his closing statement that some would consign a tube to the junk pile just at a time when it becomes most useful. Does he mean to imply that after prolonged use a tube becomes low in vacuum or that it becomes high in vacuum?

The users of coils berate the static, but for several reasons more work will be done with statics among the rank and file. I possess a portable static weighing 50 pounds, and one weighing 220 pounds. With the little one a burn can be given very readily and promptly with a low or soft tube. I have seen very rapid and satisfactory results in a severe cancer of eyelid and orbit. Plenty of therapeutic effect is available and treatment need only be 15 minutes long.

W. L. Kenney, M. D.

Ger.-Amer, Bank Bldg., St. Joe, Mo.

Comments: Dr. Burdick was speaking from a practical standpoint in his paper. It was not strictly accurate, as is well shown in this letter. Dr. Kenney's points are well taken that the X-ray, from the dynamic standpoint, is a feeble ray. Dr. Burdick meant that with a coil a ray from a low tube can be forced into and through the dense tissues of the body, and this ray will produce therapeutic changes which the rays from a high tube would not produce. The low rays are intense relative to the rays from a high tube. Dr. Kenney's proposed experiment would end in the way he predicts, but does not invalidate the claims of Dr. Burdick regarding the therapeutic value of the nonpenetrative ray. Dr. Burdick's statement regarding the

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time when a tube is of the greatest value is open to criticism, for he did not say exactly what he meant. The time of greatest value is when the tube is lowest in vacuum. It is then judged unsuited for fluoroscopic and radiographic work. It is then that the therapeutic rays are produced.

Dr. Kenney's letter shows he had read the article with great care. We are glad our journal has such readers. We wish to encourage a full and free discussion of all our articles.

X-RAY TREATMENT OF CANCER.

In the June number of the Journal of Advanced Therapeutics a most interesting case of cancer of the stomach is reported in detail and followed by two others. The note added by the editor recommending the use of the static brush discharge in conjunction with the X-ray is somewhat similar to the treatment advocated by Dr. Blackmarr. We are pleased to note that the article points out the danger of forcing too rapidly the breaking down of the cancerous tissue. We quote as follows:

Probably no subject is attracting so much professional attention at the present time as the X-ray in cancer, and undoubtedly very many things are happening which are unaccountable from the present standpoint of observation. It is a noticeable fact that in all cases of deep cancerous growth a marked reaction is induced by the first few exposures, and in other cases a frequent rise of temperature will be noted. This may be accounted for in some cases from possible sloughing that may take place in the alimentary tract, as is noticed in thick cancerous growths upon the surface and in the mouth when sloughing is in progress. Sloughing was observed as a result of exposure to a sarcoma involving the buccal cavity, and in cancer of the larynx involving the vocal cords, which was rayed from the surface and not directed upon the mucous or ulcerating surface. During the sloughing there was well-marked rise of temperature for a few days in the sarcoma of the face.

The following case, though marked by a fatal termination, showed remarkable features deserving of consideration.

M. C., aged fifty-five, cancer of stomach, diagnosis confirmed. Patient was in a critical condition when treatment was instituted. Nausea and frequent vomiting of blood and discharges having a very offensive odor and constant eructations of gas. The patient had frequent attacks of dyspnœa. On the day preceding the first raying rectal alimentation had been necessary for the first time. A tumor, indurated, five inches in length by three and one-half inches in width, could be distinctly mapped out at the pyloric end of the stomach. Cachexia was not well marked, which afforded the only encouragement. The family were anxious and the treatment was undertaken with the following results:

A ten-plate static machine was placed in the apartment, and a tube which would back a ten-inch spark-gap was used from the first. Exposures were made for fifteen minutes every thirty-six hours.

March 1, Second Raying.—Patient was found with distinct reaction—very weak, enemata retained.

Third Raying.—Patient very feeble, had vomited seven times during the previous night, aggregating one pint of blood, ejecta not so offensive as on previous day—dyspnœa with nausea, flatulence and hiccoughs continues—all fluid taken is promptly ejected—rectal enemata retained. Examination shows the margins of the tumor distinctly softening.

Fourth Raying.—Patient's condition is much improved, hemorrhages have ceased, has vomited but once in thirty-six hours, at which time there was no odor present, nausea and hiccoughs have ceased and dyspnœa not so marked. The tumor had perceptibly softened over the whole extent.

Fifth Raying.—Patient distinctly improved; nausea and vomiting have ceased and considerable water has been taken—pulse 100 and regular, and no dyspnœa. Tumor softened over whole extent.

Sixth Raying.—All symptoms favorable but pulse, which is 110, and temperature, which just preceding the treatment was 96 2-5 degrees F.; immediately following, temperature 97 2-5 degrees. Has taken eight ounces of trophonine during past twenty-four hours, by the mouth. No nausea, vomiting or hemorrhage; patient is very weak.

March 8.—Report by telephone: pulse, 112; temperature normal, taking peptonized milk; no nausea or vomiting.

March 9.—Found patient too weak to consider treatment, pulse 130, temperature 104 degrees. Patient died a few hours later. While the termination of this case was death, the results were so remarkable that they are suggestive. It is doubtful whether the immediate cause of death was from exhaustion or auto-infection.

A case in which rapid sloughing was taking place from a large elevated cancer of the face—a patient eighty-seven years of age, progressed satisfactorily for six weeks, when, twenty-four hours after the last raying, the patient was seized with a severe chill, accompanied by a high fever and great prostration. Rallying after two weeks, the tumor continued to diminish rapidly after discontinuance of treatment. That auto-infection in a person of great age caused this marked reaction there can be no doubt. That she is recover-

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ing, and, though raying has been discontinued for one month, the cancer continues to diminish in size, is instructive.

In another case an epithelial cancer of twenty-two years' growth, covering a considerable area, was treated for six weeks. Eight X-ray exposures in all were made of fifteen minutes each, with low tubes, followed for the balance of the time by static brush discharge from the wooden-ball electrode. The results in the last two indicate that many cases may be rayed more than is necessary, and probably if those which do not seem to heal under constant raying were treated by the brush discharge they would be promptly cured.

IMPORTANT!

The columns of this journal are open for discussion to every one of our readers, and we earnestly solicit interesting reports on cases treated with the X-Ray and results obtained.

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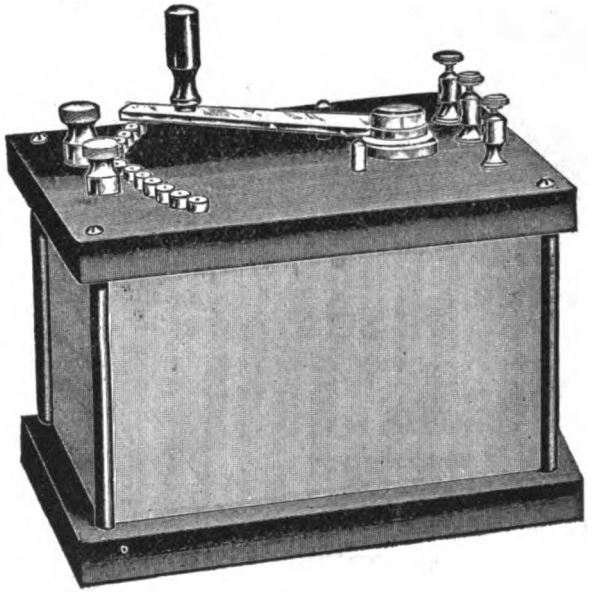
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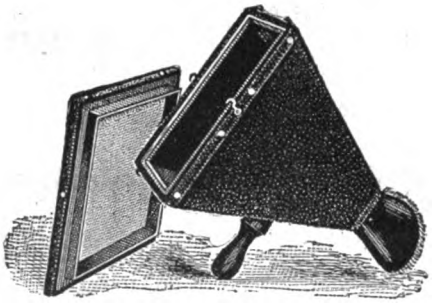
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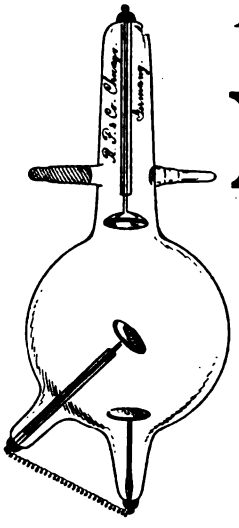
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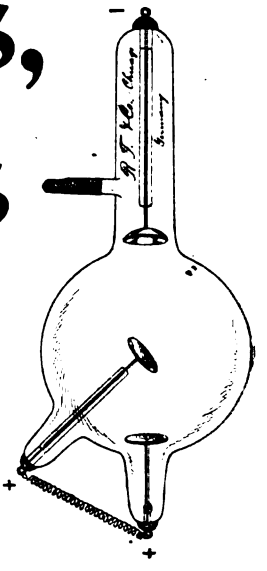
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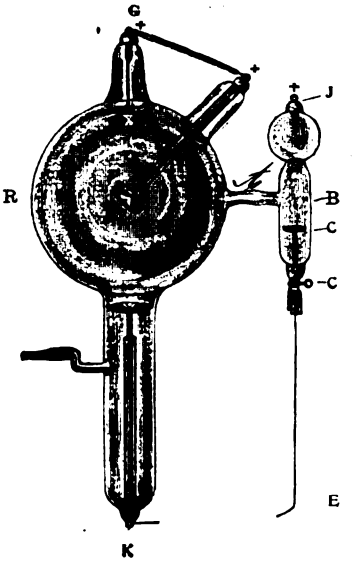


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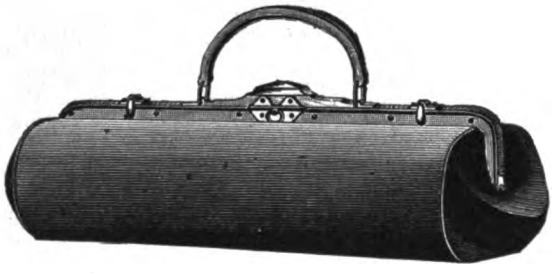
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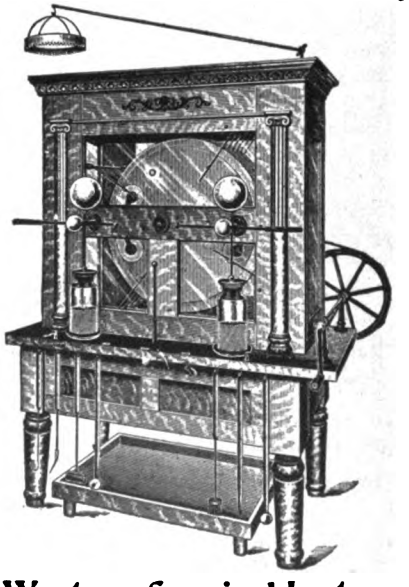
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VOL. II July, 1902 No. 7

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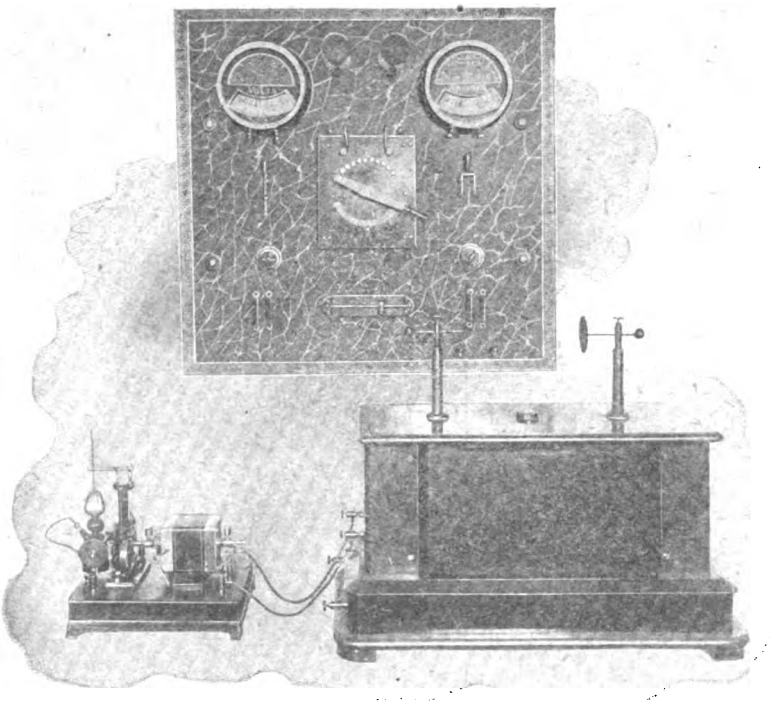
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VOL. II. CHICAGO, JULY, 1902. No. 7.

DESTRUCTION OF GERM LIFE IN EGGS BY X-RAY AND X-RAY PENETRATION.

Elmer E. Prescott, M. D.

With Four Half-Tone Illustrations.

Mr. President and Members of the Society:

Gentlemen: The paper which I have agreed to read this evening is rather a long one, and realizing that brevity is the soul of wit, I will only deal with one part of the subject to-night, leaving the remaining portion for any time you might see fit to give me.

I have been treating a number of pulmonary tuberculosis with the X-ray. Each patient has shown a decided gain, some more than others, but each enough to give decided credit to the X-ray treatment.

It is true that I have used medicine in conjunction with the ray treatment, but it is the same medicine, tonic in form and blood builder, that I used on patients previous to the X-ray treatments, without any marked gain in the patient's condition, so that I am justified in saying that the improvement which has been noted is due at least in part to the Roentgen light.

I have seen the wonderful results in other surgeons' work in the treatment of lupus, cancer and many other forms of disease.

I have heard many theories advanced for the rapid recovery from these heretofore incurable diseases by the Roentgen ray; while some of these theories seem good, none of them seem certain and positive.

I have read of the death of the jelly fish, have also read how bacteria will flourish under the influence of this peculiar green light. I have placed little chickens on the inside of a glass candy jar. I have placed other chickens on the outside of the jar, and after several treatments by the X-ray I have found that the little ones on the outside of the jar lose their feathers and soon exhibit dermatitis, while the little ones inside the glass jar have showed no effects of the exposure to the light.

I have found by experiment that it is almost as easy to photograph through sheet steel as it is through glass, and since I have accomplished this fact I have wondered if it is not possible that it is due to the receptacle in which the bacteria are cultivated—that is, if the actinic rays are not interrupted in passing through the different forms of receptacles in which the bacteria are grown. For who would think of treating a case of cancer of the breast with the ray by covering the breast with a solid piece of sheet steel and expect to accomplish good results? Then why should we expect to destroy our bacteria by placing them in a dish whose same material, if placed over a diseased portion of the body, would give us negative results?

I have exposed eggs to the X-rays for twenty minutes each day, some I exposed one day, others two days, others three, four, five, six and seven days. Then, taking other eggs which had not been exposed to the X-rays and placing them under the hen and in the incubator, I have found that those exposed to the rays invariably failed to hatch. Of forty eggs exposed four days, all showed signs of life, but not one progressed beyond the tenth day of incubation.

Of ninety-six eggs exposed six, seven, eight days and longer, not one showed any signs of life.

I have removed eggs from the incubator after they had been exposed to the usual heat of 103 degrees for ten days, which have been previously exposed to the rays for eight days, and have found them to be in perfect condition.

Microscopically I can find no difference between the eggs which have been exposed to the ray and those which have not been exposed to the ray. There has certainly been a chemical change in the germ life of the egg, but what that change is I am unable to state. In the eggs we have no leucocytes, therefore we cannot assign leucocytosis as a factor in bringing about this change. I do not think it is hydrogen per oxide that has formed from the absorption of ozone in the eggs, for I placed pus and fearfully decomposed eggs with the material of the eggs that have been exposed to the Roentgen rays and did not get the characteristic effervescence.

But I am getting off my subject. I have been informed by several of my friends that they have tried to destroy the germ life of the egg by the X-ray and have failed to do so. One of them stated that he had experimented quite extensively; that he had purchased the lowest tube possible at an expense of $45; that he had tried in every conceivable way to destroy the

*Paper read at the Meeting of the Chicago Electro Medical Society, June 24th, 1902.

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Fig. 1.

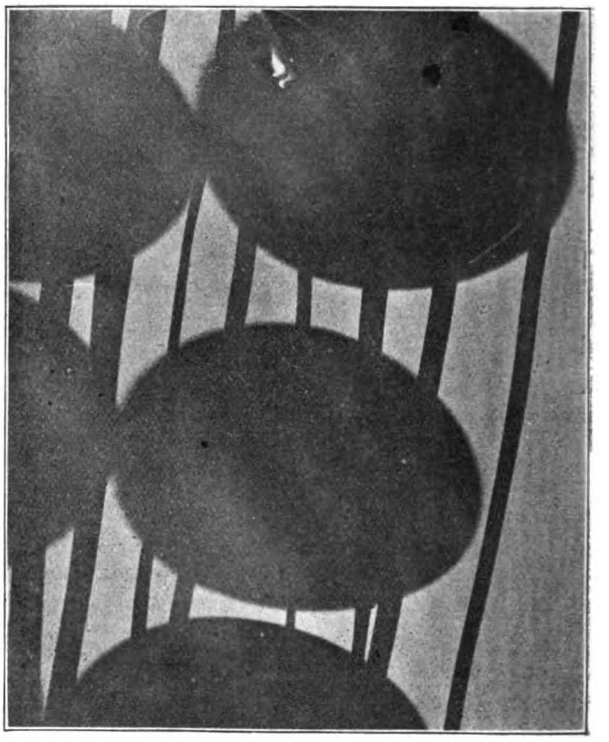


Fig. 3.

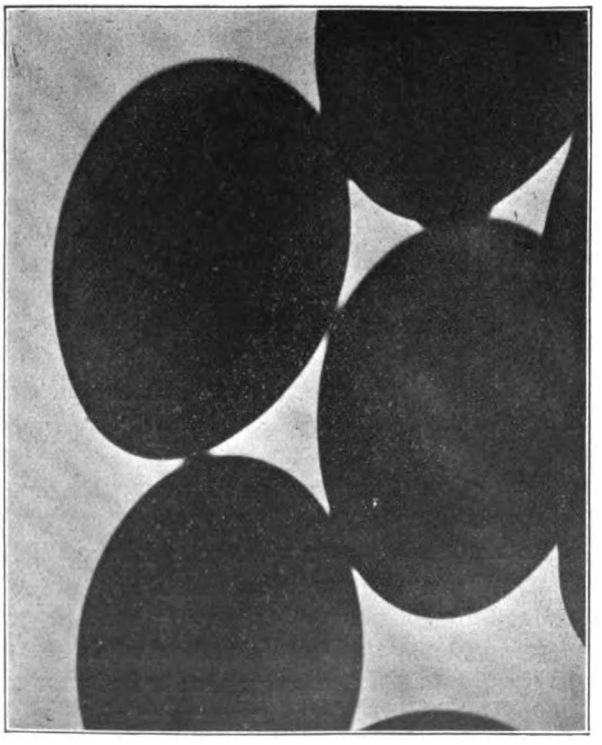


Fig. 2.

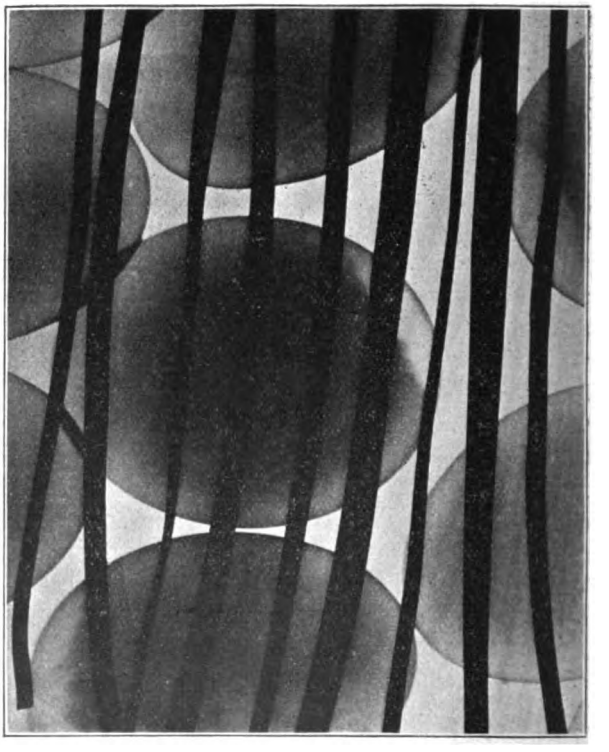


Fig. 4.

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germ life of eggs by the use of this tube, but had failed.

I want to say that I experimented with nearly one hundred eggs with a tube of this character, and although I exposed the eggs from two to three hours a day for a period of ten days, I also hatched nearly every one of my eggs.

I have here a radiograph of eggs (Fig. 1) taken with this form of tube, and I present you absolutely nothing. With this form of tube there is absolutely no form of actinic rays developed, not even enough to produce the least shadow in the negative.

I now present you a radiograph (Fig. 2) of the same eggs, but with a higher tube. You can see the distinct shadow of the eggs, which is not perceptible in radiograph (Fig. 1).

I now present to you radiograph Fig. 3. Over the sensitive plate previous to exposure I placed a number of strips of lead, then I placed the eggs over these strips of lead; then exposed the same for a period of one minute, and you see we have the shadows of the lead running up to the shadow of the egg, but not through their shadow. In this case I used the same height of tube as in Fig. 2.

I now present to you radiograph Fig. 4, in which I used a little higher tube, and in this picture you will see the shadow of the strips of lead pass through the shadow of the egg. This was the strength of the tube I used in which I successfully destroyed the germ life of the egg. In every case where I use a tube so low that the ray would not penetrate the egg I invariably hatched the chickens.

In conclusion I want to say that in treating various form of neoplasms I think I have demonstrated by the eggs the useless folly of using very low tubes. Your light must penetrate the depth of the substance you are trying to destroy, and if you use a medium that is going to interrupt the passage of the ray you cannot accomplish the results you are striving for on bacteria, diseased tissues or eggs.

Discussion.

Prof. Treadwell by questions elicited the statement that the unexposed eggs had been submitted to all other conditions that those exposed to the X-ray had experienced, and had uniformly hatched. He then stated that the work should be warmly commended, that to his knowledge it was the first set of experiments on eggs reported. The experiments seemed thoroughly satisfactory. The rays were therefore capable of preventing the development of a certain kind of embryonic life. It was well shown, also, that the ray must be of great enough penetration to reach the tissues to be rayed. It showed that a feeble generator would be of little service except in the most superficial lesions, whereas a powerful coil could force the more penetrative rays to considerable depth in muscular tissue.

Dr. Pratt called attention to the fact that the radiographs themselves show that the first failures to kill the embryos were due to very feeble rays because of the low vacuum of the tubes. The X-rays must be penetrative enough to get to the embryo and produce decomposition.

Dr. Burdick said that the paper was the first in his knowledge dealing with the subject. The results were gratifying. He began such a set of experiments, but at that time was unable to get eggs that would hatch, even when not exposed to the ray, so he had to abandon the work.

A great source of confusion in X-ray work is the specification of the kind of tube. This confusion is at present unavoidable. A low tube varies widely according to the judgment of the operator.

In order to secure a satisfactory low tube a physician ordered one to be especially made for him. When brought to Dr. Burdick's office the tube was much below the vacuum of X-rays, giving, indeed, the characteristic Geissler effect of a bluish white light. Dr. Burdick had to run the tube for an hour and a half on his coil before X-rays would be produced at all. The purchaser of the tube evidently knew little about a low tube. Among manufacturers of tubes there is recognized a point in reducing the vacuum of a tube called the "line." Below the line no X-rays are produced. The tube mentioned was below the line and in that condition was useless. Dr. Prescott's work shows that a very low tube was useless for raying deep structures unless under special conditions.

Dr. Burdick then explained his method of selecting the proper tube for any given case. He takes the patient into the dark room and makes a fluoroscopic examination of the region to be treated. He then reduces the vacuum until the fluoroscope is barely illuminated. This may mean a medium or medium high tube. Tissues in some patients seem to be opaque to the ray. One case was especially instructive. Renal calculi were suspected and a radiograph was taken with the usual technique.

It was found, however, that no contrast in tissues was obtained. A fluoroscopic examination of different parts of the body showed that the muscles were of apparently the same density as bones. The man was a laborer and was used to carrying heavy weights. His muscles seemed full of calcium salts. It was only after several trials that a satisfactory radiograph was obtained. Some failures in the treatment of internal growths may doubtless be due to the opaqueness of the tissues. In any given case the lowest tube that will force the rays into the tissues is the one to be used.

Dr. Burdick then explained a method by which

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he can secure a very penetrative ray from a low tube. Usually a tube is joined to the terminals of an induction coil without a spark gap. He, however, uses a spark gap on the positive electrode of suitable length to give the required penetrative power. When asked by Dr. Pratt to explain the use of the spark gap, Dr. Burdick made the following statement: A spark gap is absolutely essential between the tube and the static machine, because the resistance of the tube alone is not great enough to allow the static machine to generate charges of a magnitude suitable to produce any considerable bombardment of the anode by the cathode rays. The X-rays generated by this bombardment are therefore feeble. A spark gap in series allows the collection of comparatively larger charges on the terminals of the static machine and a greater amount of energy is furnished to the tube. The cathodic bombardment is therefore greater and the X-rays generated are more penetrative. The same fact is true in a less degree with the coil. The spark gap produces a more powerful discharge through the tube, and therefore produces a more powerful X-ray. A somewhat analogous case occurs in the incandescent light circuit. If a short circuit is made at any point of the circuit the lights go out, because the dynamos cease to generate. A suitable resistance is necessary to secure voltage and amperage. The same holds true with the static machine and induction coil.

Dr. Hall, while agreeing with the explanation offered, stated he had observed that the fluoroscope was more brilliantly illuminated when the spark gap was at the negative terminal of one of his tubes.

Dr. Baer, reverting to the effect of X-rays on embryonic and bacterial life, said that certain tests on bacteria seemed unsatisfactory. The reports of the experiments stated that the cultures were in test tubes. The walls of the tube would shut off some of the rays, sufficient, possibly, to prevent the destruction of the colonies.

Dr. Burdick held that glass does not obstruct to any extent the photo-chemical power of the rays. He had tested this in several ways. In one experiment he had sent the rays through several lenses, and a photographic plate beneath them showed only a slight shadow of the lenses.

Dr. Worthington said that there were several kinds of glass, some of which might be very opaque to X-rays. Dr. Burdick replied that, though lead glass is comparatively opaque, many test tubes are of sodium or potassium compounds. To a reply of Dr. Prescott that an image of a glass object is obtained on the photographic plate, showing obstruction to the rays, Dr. Burdick replied that even paper showed a slight mark on the photographic plate, but neither paper nor glass would necessitate any increase in the time of exposure.

In his experiments with X-rays on bacteria the colonies were held in petra dishes, over which was pasted paper to prevent infection from the air or any possible inhibition of their growth by ozone. The X-rays, therefore, did not have to traverse the glass walls of the dishes, but were sent through the paper covering. None of the bacteria were destroyed, but the chromogenic properties of some non-pathogenic species were affected. They seemed also to flourish more luxuriantly if exposed to a high tube than when unexposed, as proved by the following fact: A lead plate with an aperture was placed over one of the petra-dish colonies, which were then treated with a high tube. The parts exposed grew more than those protected by the plate.

Comments: The success of Dr. Prescott will doubtless encourage other experimenters to repeat his work and test his results. His experiments are certainly most satisfactory as examples of scientific work.

We want to call the attention of our readers to Dr. Burdick's technique, both in determining the required vacuum of the tube for any given case and in the operation of the tube by the coil. Few operators, we believe, include a spark gap between the tube and the coil. Dr. Burdick determines the most suitable length of the spark gap and whether one or two are necessary by the fluoroscopic illumination produced. When this adjustment is perfect a powerfully penetrative ray can be obtained, even from a comparatively low tube.

SUPRACONDYLOID FRACTURE OF THE HUMERUS.

The following paper by Alwin H. Schwab, M. D., was read before the Medical Society of the County of Kings and was published in the April issue of the Brooklyn Medical Journal. We print the discussion, as well as the article, because the recommendations are of great value:

My object in bringing this subject before you is to consider the value of the Roentgen rays in these, and, in fact, all cases of fracture and dislocation, and to report a method of treatment which has given me such good results in four successive cases.

By the use of the Roentgen rays accuracy takes the place of ignorance and doubt, and painful manipulations are no longer necessary for diagnostic purposes. This is especially true of fractures in and around the elbow joint, where, in many cases, an exact diagnosis, without skiagraphy, is almost impossible. A large number of fractures were formerly looked upon as contusions or distortions. The exact line of fracture, with any complication, can be seen, and after reduction we can assure ourselves whether the fragments are in

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apposition and whether articulating surfaces are disturbed or not. Since the advent of this aid to diagnosis it has often been shown that a fracture supposed to be perfectly reduced and properly dressed was not reduced at all and no apposition of the fragments accomplished.

Certain important points should be borne in mind. In taking skiagraphs of the extremities for supposed injuries we must not be satisfied with taking the limb in one position, as often a line of fracture will not be visible from one point of view, but will show plainly from another. It is always advisable to take at least two skiagraphs, say one giving an anteroposterior view and the other a lateral view.

It is well to remember that we do not have a picture of the bone, but a reproduction of the shadow of the bone. The proper interpretation of a skiagraph necessitates some experience and time. A knowledge of the anatomy and the relations of the part to be skiagraphed, and especially of the centers of ossification of bones and their epiphyses, is required. There is quite a difference in a skiagraph of an adult joint and one of the same joint in children at different ages. I mention this to facilitate the study of the skiagraphs to be demonstrated this evening, and would recall to your minds the method of development of the lower end of the humerus, which is the only part entering into the subject of this paper.

At the end of the second year ossification commences in the radial portion of the articular surface, and from this point extends inward so as to form the chief part of the articular end of the bone, the center for the inner part of the articular surface not appearing until the age of twelve. Ossification commences in the internal condyle about the fifth year, and in the external one not until the thirteenth or fourteenth year. About the sixteenth or seventeenth year the outer condyle and both portions of the articulating surface unite with the shaft; at eighteen the inner condyle becomes joined.

The skiagraphs shown to-night being of children between the ages of four and one-half and five and one-half years, the only ossification center seen is that for the radial portion of the articulating surface, the remainder of the lower end of the bone being still cartilaginous.

Fracture of the shaft of the humerus above the condyles is of frequent occurrence. It is seen mostly in children under twelve years of age and is caused by a fall or blow upon the hand or elbow. (This same accident usually produces a dislocation in adults.) It is sometimes complicated by a vertical fracture extending into the joint, producing the so-called T fracture. The lower fragment is nearly always drawn backward by the action of the triceps muscle.

There is a great difference of opinion among surgeons as to the proper treatment of these injuries, which goes to show that in none of the methods used is the surgeon always sure of obtaining perfect results. One difficulty is to obtain apposition of the fragments and to keep them in place when once reduced. Stimson in talking about intercondyloid fractures, which statement is just as true in these fractures under discussion, says: "In intercondyloid fractures, with marked separation, there is no practicable means surely to maintain reduction. The impossibility of direct control of the fragments, the contraction of the muscles and the pressure of fascia combine to make the result largely a matter of chance."

The main object has been to prevent impairment of the normal humero-ulnar angle, which gives the "carrying function" to the upper extremity, and which, if impaired, causes the so-called gun-stock deformity.

Another difficulty is the prevention of anchylosis, which would interfere to a greater or less extent with the normal movements of the joint.

The two prevailing methods used in the treatment of these fractures are: (1) By the fixation with the arm in the flexed position, either acutely flexed or at a right angle; (2) by fixation with the arm in extension.

Roberts elicited 88 replies from surgeons as to their methods of treating injuries about the elbow joint as follows:

a. Flexed position preferred, 65.
b. Extended position preferred, 15.
c. Both positions used, 7.
d. No definite answer given, 1. Total, 88.

He prefers the method of fixation with the arm in comfortable extension, and also states that "Fixation is satisfactorily obtained by nailing the fragments together by long nails driven through the skin." He has, however, had no clinical experience with this latter method.

Beck states: "Whether immobilization is better kept up in the extended or in the flexed position should be determined by the ease with which the fragments can be kept reduced in either of them. In most cases the decision of this much-discussed question should be left to the surgical instinct." He uses circular plaster dressing from shoulder to wrist.

Scudder prefers the flexed position, using the internal right-angle splint to hold the fracture.

The method used in the treatment of these cases is not original with me, being one especially advocated by certain French surgeons.

On the day of the injury, or as soon as the case is seen, a skiagraph is taken and the injury noted. The fracture is then reduced, pressure being used upon the

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fragments in the proper direction, which can be accurately demonstrated by the skiagraph. Massage of the joint, arm above the forearm below it, is instituted at once. The arm is then placed in the flexed position and a loose molded splint is applied, the whole being held in a sling. Daily treatment of the arm by massage, with slight passive motion of the joint, is carried out, and skiagraphs are taken at frequent intervals as a source of control. The splint referred to above is not applied to fix the fragments or joint, nor do I aim at any fixation whatever, excepting such caused by flexing the arm. Early massage does much to get rid of the swelling and hastens the absorption of blood and exudate, stimulates nutrition and keeps the muscles supple. I especially wish to lay stress upon the value of the Roentgen rays, not only for diagnostic purposes, but as an aid during the process of repair of these fractures. Frequent skiagraphs taken will show the position of the fragments at the different intervals, the amount of callus and its formation. Any too great a displacement can readily be remedied, and until such time as the callus has become organized slight pressure on the fragments will replace them in position. The shadow pictures before you will demonstrate the injury and the condition at various times during the process of repair. You will notice that at certain times the fragments are not in exact apposition, but that the ultimate result is a perfect joint. Any displacement can be remedied at the time of the massage treatment by exerting pressure upon the fragment, and even where a slight displacement remains, nature will take care of this by a process of remodelling and absorption of callus.

The results I have obtained have been so gratifying that I shall continue using this method. The ultimate results have been:

1. An absolutely perfect joint, capable of all normal movements to the greatest degree.
2. No visible deformity.
3. No anchylosis.
4. No gunstock deformity or loss of carrying function.

Roberts, discussing these injuries, says: "Massage and very slight movements of the joint in judicious hands will hasten restoration of muscular movements and do great good if begun at the time of fracture and continued daily. This is not what is usually meant by passive motion after fractures, and requires skill for its proper use."

In conclusion I would repeat that by making use of the Roentgen rays at frequent intervals we can see the position of the fragments, the gradual production of callus and remedy slight defects. Skiagraphs are better and more satisfactory than the use of the fluoroscope or screen, cause no pain or discomfort to the patient and can be studied at leisure.

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Discussion.

Dr. Barber: The subject of fracture in the location indicated in these pictures, which are being passed around, is certainly of great importance, especially when the accident is among young children. Cases often come to us with injuries about the elbow joint with considerable swelling, and the question arises whether there is a fracture or not. If we depend entirely upon our own resources, that is, the ordinary method of making the diagnosis of fracture, it will be almost impossible to come to any definite conclusion until the swelling has subsided, then, of course, we can in many cases make a positive diagnosis; but there are instances where the signs of fracture are absent after all signs of traumatism have disappeared, but when the skiagraph is taken of these cases it shows very readily the point of fracture, and then we are in position to know exactly what to do. It is certainly wrong for us to go ahead and endeavor to treat these cases without having come to some definite conclusion. We either treat them too little or too much.

I have seen instances of fracture at this point where it was impossible to make a diagnosis without the aid of the Roentgen ray. In adults, of course, that point of delicacy which is needed in a child is done away with and the fracture can be readily made out; but in these cases we usually have a displacement with other symptoms wanting. In using the X-ray under such conditions as this paper has indicated, it is perfectly plain that the fracture exists or does not exist. As to the line of treatment to be followed in the care of fracture, the one which the doctor has described is certainly as good as any that has been brought before us for many years. It does away with many of the complications sometimes encountered where we use a permanent splint. We have the case under observation, and by the use of the X-ray we know exactly the progress of the case and the result of manipulation, which can be applied without very great pain. The little children bear the massage used at the joint well and it is not after the first or second trial any great annoyance to them and can be kept up without any trouble. They have a great deal more freedom. The swelling is diminished very promptly and the case goes on to a very much more rapid recovery than under the old and ordinary ways of treating fractures. I know, with many men, it seems to them a great chance to take in dealing with these patients as we do, fearing that during the interval that they are away from us something may happen to the parts and therefore cause a bad deformity which is impossible to correct;

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but if the case is watched, as indicated by the doctor's paper, from day to day, the patient coming to our office and having the advantage of frequent pictures of this fracture or injury, we can readily correct any deformity which may take place within the short interval elapsing between the patient's visits.

My personal experience with it is that it is perfectly safe where you have a patient whose parents have the ordinary amount of intelligence to appreciate the condition. After the first two treatments they seem to understand what is to be accomplished and do not object to it.

As the doctor has indicated, the picture taken in only one position is of little or no value. It must be taken in two positions at least, or, perhaps more. The temporary splint which is applied from one day to another is a source of no annoyance to the child, and is of practically no support. I think the impression which it has upon the parents is of more use than the application of the splint to the fracture. It really is hardly necessary under the circumstances, and I am sure if any of the gentlemen have any experience with this method of treating these cases they will use it entirely with fractures of the lower end of the humerus and any other fractures of the body in which it is recommended.

Dr. Schelling: This very interesting subject this evening recalls to my mind a case that I treated about three months ago in which a colleague of mine made a diagnosis in a child eight years of age of compound fracture of the internal condyle of the humerus, and I sent the case immediately to Dr. Lee, who took a skiagraph of the case. He found an oblique fracture of the lower end of the humerus, with displacement of the lower portion of the humerus external, and the upper portion internal, which was reduced and put in complete extension with a slight weight. She made a very good recovery. Allow me to present a picture for inspection.

Dr. Maddren: I would like to add my word of commendation of the method of treatment the doctor has recommended. For a number of years it has been the rule with me where a fracture has invaded or occurred near a joint, like the elbow, to replace any displaced part, and if by position and a sling they remain in place not to apply other fixation splints or apparatus; to apply evaporating lotions for a few days, then commence gently and gradually increasing daily movements of the joint, being careful not to use enough force to displace any of the parts. I encourage the patient to early make and repeat often such movement of the joint as I consider safe. I use frequent douchings with cold water and massage to stimulate the circulation and absorption. The doctor calls attention to the difference between passive motion and this manipulation of the joint which he recommends, which I think is a very good point. The length of time the joint takes to recover under these circumstances is very much less than under the old method of putting it up for three, four or six weeks and then looking at it. The results are certainly very much better in the restoration of function.

TREATMENT OF BOILS AND CARBUNCLES WITH ELECTRICITY.

Dr. H. A. Dow in the April issue of the Electro-Therapeutist reports the following case and the method of treatment:

A young man twenty-four years old had been to Florida during the Cuban war, came home, a large carbuncle broke out on his forearm. He went to a good surgeon and had it lanced. Germs got in and he had a drainage tube pulled in and through it about four inches long, when he showed it to me (this laid him up about two months), I told him the next time he had a boil like that to come to me, and I would not stop him from his work. About six months after he came to me with a similar one on the opposite side of his arm. I introduced an electric needle to the depth of one-half inch, or to the bottom of the core, and turned on five milli-amperes of negative galvanic current for two minutes, then used the faradic around it to start up the circulation, so as to relieve the congestion. I gave four treatments with the faradic battery on the four following days, and dismissed the case cured. Now the principles: Used the galvanic current to destroy the germs that had been at work; then used the faradic current to open the circulatory system to carry away waste material. Result, boil degenerated and dried up.

THE STATIC DISCHARGE AN AID TO X-RAYS IN TREATMENT.

We recall to our readers a report in our May issue of the technique Dr. Blackmarr employed in treating a case of schirrus of the breast. In that article Dr. Blackmarr advocates the use of the static brush discharge on alternate days with X-ray treatments. Dr. William B. Snow had a case of epithelioma reported in the July number of the Journal of Advanced Therapeutics. The cancer was very extensive just below the hair line at the back of the neck. It was first treated with the X-rays alone on alternate days for sixteen days. He used also the static brush discharge of negative insulation three times weekly. Photographs taken before and after the course of treatments show the satisfactory result. Dr. Snow concludes that the static brush discharge hastened the cure materially.

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NOTICE.

The Chicago Electro-Medical Society adjourned during the summer months. The next meeting will be held Tuesday, September 30th.

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CHICAGO ELECTRO-MEDICAL SOCIETY.

The thirteenth regular meeting was held in room 510 Masonic Temple, June 14, 1902, President Burdick in the chair.

Minutes of the last meeting were read and approved.

The name of W. P. Coons, M. D., was by motion ordered to be added to the roll of members.

Dr. E. E. Prescott read a paper on the effect of X-rays on hens' eggs. The paper was discussed by Drs. Baer, Pratt and Burdick and Prof. Treadwell.

Dr. P. C. Clemensen gave a report on the most recent phases of the Finsen light treatment. Discussion was continued by Drs. Burdick and Hall.

Dr. Baer moved that when we adjourn we adjourn to the time for the regular meeting in September. Carried.

On motion of Dr. Pratt, the executive committee was instructed to obtain from members the titles of papers to be presented by them at the next meeting of the Roentgen Ray Society of America, and send the same to the executive committee of that Society. Adjourned.

T. P. HALL, Secretary.

A FAMILY WARNING.

The following editorial in the May issue of the American Medical Monthly will commend itself to the judgment of all experienced therapeutists:

Any one having had practical experience in the X-ray treatment of malignant and other conditions can but be amused at the simplicity of this statement in Medical Council:

"We feel it our duty to prominently call attention to the phenomenal efficacy of the X-ray treatment of all forms of malignant growths of the surface of the body. Thus lupus and rodent ulcers of many years' standing, that have failed to respond successfully to every known form of treatment, are promptly cured by a number of exposures to the X-rays. The same applies superficial to cancers of all kinds, and to many cases of chronic eczema.

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Many will be disappointed about the "promptness"; and in a somewhat extended experience we have not found the five-day and ten-minute treatment to be efficacious. There is much more required for the successful treatment of these conditions than the above clipping would indicate, and the tyro who expects immediate results will be sadly disappointed—as also his patient.

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TREATMENT OF MALIGNANT GROWTHS.

In the July number of the. Journal of Advanced Therapeutics a report is given of an interesting discussion concerning the technique of X-ray treatments and results obtained. Dr. Clarence E. Skinner reported that he had 41 cases of cancer under treatment in the last four months. He had only two deaths to report, both cases being in a cachectic condition before treatment. All the other cases were improving, some having been discharged from treatment.

Dr. Skinner believes it is necessary to produce a slight dermatitis in those cases that do not yield to treatment. In several external cases the improvement was rapid only after the dermatitis had appeared. In other intractable cases treatment was discontinued for a few days after the appearance of the dermatitis, when the improvement was sudden and rapid. As an illustration, an old lady over 80 was treated for epithelioma of the face. Eight treatments produced no improvement; treatments were discontinued for a week, when three-fourths of the area was healed over. She subsequently fully recovered. Dr. Skinner recommends a coil where a dermatitis is desired. He shifts from static machine to a coil for intractable cases, but in all others he prefers the static machine.

He recommends treatments on alternate days for the first two weeks, which will reveal the patient's susceptibility to dermatitis. He places the anode of the tube about ten inches from the skin of the patient and gives a fifteen-minute exposure with a static machine. He uses a high tube for all growths that extend three-fourths of an inch or more below the skin. For superficial growths he uses a low tube.

After two weeks, if no dermatitis is produced, exposures may be made every day for four or five days, after which they should be discontinued for an equal period. He believes that growths in the breast should receive surgical treatment and the X-ray should be used immediately after. Only 50 per cent of his breast cases have shown satisfactory improvement under the X-ray alone. Growths in other tissues yield more readily, as illustrated in the following case:

A man forty years old had a tumor in the neck about the size of the fist, extending from the jaw to the mediastinum. Two Boston surgeons had pronounced his case inoperable. For about a month the treatments produced no effect. Suddenly the tumor began to decrease in size and there is now no trace of it.

Dr. Robert Newman reported a case of orbital sarcoma which had developed after the removal of a polypus from the posterior nares. The growth caused the eye to protrude from the socket. The case was exhibited before a medical society and pronounced fatal, some of the members predicting that his debility would be so great that in three days he could not come for treatment. Vision in the left eye had been destroyed. After three weeks' treatment with the X-rays the general condition of the patient has improved, his weight has increased and the tumor is smaller. Improvement in the case was confirmed by Dr. Snow.

Dr. Bieser, who saw the patient of Dr. Newman, concurred in the apparently hopeless condition of the patient previous to the X-ray treatment.

Dr. Skinner reported a similar case in which the eye was more than half extended from the socket. After six weeks' treatment, three times per week, the nasal canal became almost free and no prominence of the eyes could be noticed. The general condition of the patient was much improved.

Dr. Wm. B. Snow called attention to the sloughing that occurs in almost all cases of extensive cancerous invasion. He had noticed this not only in external growths, but in a large sarcoma of the face where sloughing occurred within the month; also in carcinomatous growths in the larynx and in a case of cancer of the stomach, where symptoms pointed to internal sloughing.

Dr. Snow also spoke of the evidences of auto-infection—marked fever, occasional chills, a varying degree of exhaustion. These rarely prove fatal except in exhausted patients. He held that the rays should be used even in hopeless cases, because of the analgesic properties of the rays, and if auto-infection were to result the hastening of the inevitable may be a mercy.

Dr. Snow believes that the X-ray, through its vibratory character, stimulates the normal activities of normal cells when a high tube is used with short exposure, and this activity produces, in some cases, an entire removal of the abnormal tissue without evidences of disintegration. He holds that longer exposures destroy the abnormal tissue elements of low vitality without affecting the normal tissues, and the abnormal tissues break down and disappear either through the lymphatics or by sloughing.

He has come to the following conclusions regarding X-ray treatments:

1. All inoperable cases and every superficial cancer should be treated by the X-ray. The inoperable cases, because of the relief afforded, and the fact that success has already been achieved in so many where the outlook for recovery was hopeless. The superficial cases should be treated by the X-ray because from operative procedure they almost invariably return, while to the present time the rays promise more.

2. All cases which are operated upon should be subsequently rayed upon alternate days for periods to be determined by various indications.

3. Observation derived from the treatment of numerous recurrent cancers of the female breast justifies the statement that if the surgical procedures are

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carried out in conjunction with the Roentgen ray in cases of small tumors it is no longer necessary to remove the entire breast, and removal of the lymphatic glands in the axillary space may in most early cases be dispensed with. And no operation should be performed until the rays have first been employed.

4. Where extensive tumors are present in bone or soft parts, in regions where surgical operations will with safety remove the whole or a large part of the mass, it is advisable that it be done and that the operation be immediately followed by systematic employment of the X-rays, that the case be judiciously watched, and upon the slightest evidence of a return the rays be again employed. Under such regimen the mortality from cancer will be very materially reduced.

Dr. Mitchell advocated opening a cancer where there was fear of auto-infection. The cavity could be packed so as to secure adequate drainage.

Dr. Skinner concurred with Dr. Snow's statements regarding auto-infection and sloughing likely to result in the treatment of large cancers. He noted these phenomena in a sarcoma of the superior maxillary and in two uterine cases. He advocated removal of the growths by operation, to be followed by X-ray treatments.

Comments: The above discussion will be of interest to our readers both because of its theoretical and practical value. Dr. Snow's explanation of the effects of the X-ray on abnormal and normal tissues is certainly pretty well borne out by the facts. Several papers have already been published in this journal mentioning the degeneration produced by X-ray treatments in abnormal tissues. The presence of dangers of auto-infection and sloughing have been pointed out. It is therefore a satisfaction to feel that X-ray therapeutists are beginning to have a more definite idea concerning the operations of the X-ray on the tissues. His conclusions concerning the technique of the treatment and its limitations will commend themselves to the judgment of all practitioners.

The experience of Dr. Skinner seems very satisfactory. We are much interested in his preference of the static machine in all but intractable cases or where he wishes to produce a dermatitis. We are inclined to the opinion, however, that although his reports are very favorable to the static machine, the experience of other operators has led them to prefer the coil for deep-seated growths. There can be no doubt, in any case, that the static machine has not been proved useless in X-ray work. It has not been superseded by the coil, as has been stated in some quarters. Some of the most satisfactory results have been produced by the static machine as a generator.

In conclusion we adopt Dr. Skinner's advice to all X-ray therapeutists that a careful record of the progress of cases should be kept from week to week, for we are going through a period in the history of the treatment of malignant growths which is of the greatest importance.

TREATMENT OF ANEURISM WITH THE GALVANIC CURRENT.

We make the following abstract from a paper by Dr. W. H. Walling published in the June number of the Philadelphia Medical Times. In the rapid development of static and X-ray treatments galvanism seems neglected, but it cannot be thus relegated to an inferior place in electro-therapeutics without a distinct loss. Operative treatment of aneurisms is not always practicable, and in such cases galvanism is of much value. The following technique is recommended:

Treatment.—The location and probable extent should determine the precise method of procedure. An aneurism of the ascending aorta, for instance, could only be reached through the walls of the chest, and it may be stated that electrolysis offers the only surgical means of relief.

The popliteal space is perhaps the most frequent site of aneurism, but it must be differentiated from malignant disease of the bone, or a ganglion, which is not difficult, unless it has become diffused or broken down, in which case amputation may become necessary.

Having satisfied ourselves that the tumor is an aneurism, the patient must be laid prone and the limb elevated as much as possible. The battery being in readiness, apply the cathodal pad to the thigh or body, cleanse the space and have assistants make firm pressure upon the artery, both above and below the tumor. Quickly thrust two to four needles, connected with the anode, into the sac, turn on a current of twenty-five to thirty ma., and allow it to flow for twenty to thirty minutes. Take plenty of time. Let the tumor feel solid and firm before removing the needles, reversing the current for a few seconds for this purpose. The clot formed by the anode is dense and firm and the needles will be held by it, and if forcibly removed without reversal of the current, bleeding may follow. By such reversal the needles are released by negative electrolysis, as the clot formed by the negative is soft and yielding.

Before attempting to operate upon any tumor one should practice with needles in freshly drawn blood; in egg albumen; meat and other coagulable substances, in order to become familiar with the action of the poles.

At the cathode will appear frothy, being filled with bubbles of hydrogen, while that at the anode will be firm and adherent.

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It is not absolutely necessary to make pressure, as above directed, but if properly done it will facilitate the operation. The sac must be kept full, but if the pressure be intermittent, this may not be done, in which case it will be better to omit altogether and depend on the anode to close the canal.

There is little danger of embolism when the anode is used, and the treatment of an aneurism wherever located may be practically carried out, as just laid down. The larger the sac the more time it will require to form an adequate clot.

TREATMENT OF CORNS WITH ELECTRICITY.

Dr. W. H. Walling, in the Philadelphia Medical Times, recommends the following technique.

Corns.

These may be treated with the static spark; or, if very tender and painful, with the galvanic anode and cocaine.

Place the foot upon a wet foot-pad attached to the cathode, and apply the 4 per cent solution of cocaine to the inflammation with the anode, using two to five ma. for five to ten minutes, once or twice daily. If an abscess has already formed, treat surgically, and apply the current to promote rapid healing.

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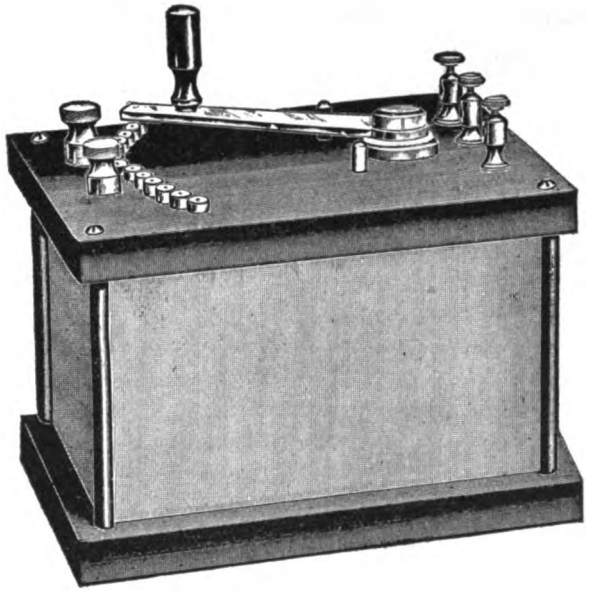
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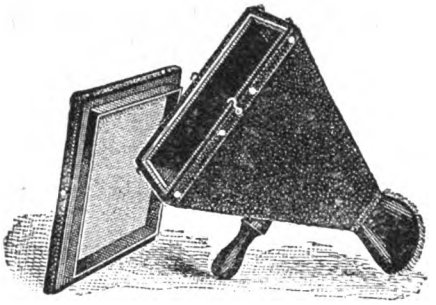
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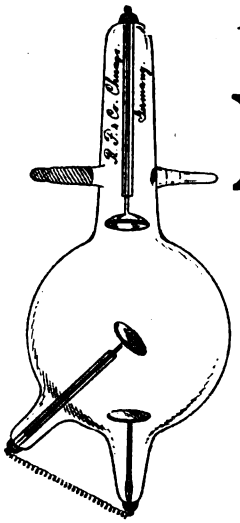
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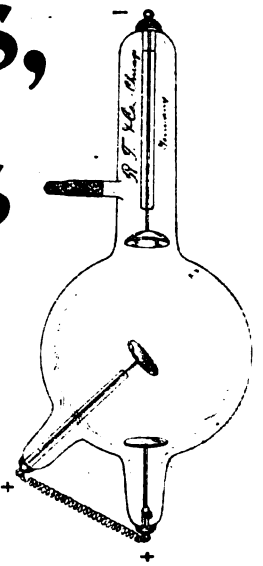
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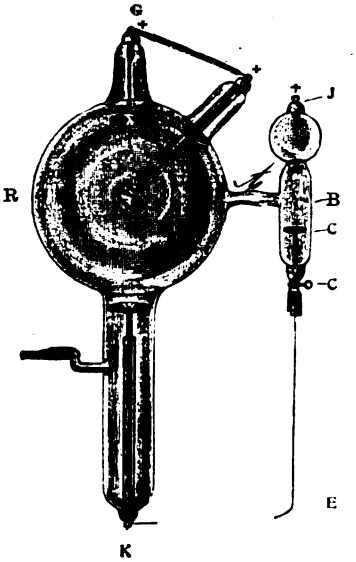
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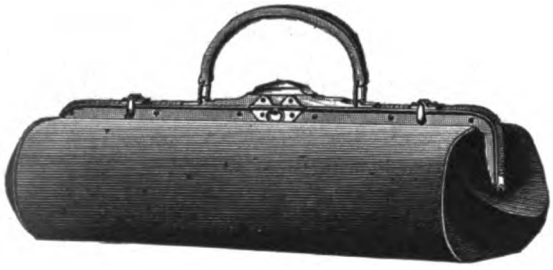
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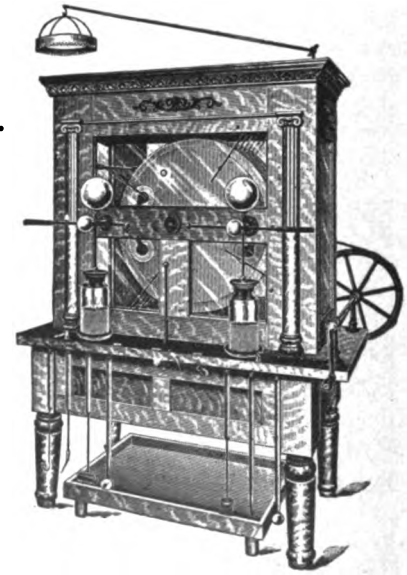
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AMERICAN
Electro-Therapeutic and X-Ray Era

A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, AUGUST, 1902. No. 8.

THE TREATMENT OF MALIGNANT GROWTHS BY THE X-RAY, WITH A PROVISIONAL REPORT ON CASES UNDER TREATMENT.

By William J. Morton, M. D., New York.

Case I.—Sarcoma at Elbow Joint.—Dec. 28, 1901: Miss E. P. was referred to me by her father, a physician. Preceded by some prior symptoms ascribed to rheumatism, this patient developed, in July, 1901, pain, inability to use the joint, and a swelling above the internal condyle of the left elbow. Pain and swelling increasing, sarcoma or tubercle was diagnosticated by Dr. Virgil P. Gibney, and the tumor excised. The wound not healing, in November the arm was amputated at the upper third of the humerus by Dr. W. T. Bull. Microscopical examination showed round-celled sarcoma. Patient comes to me for treatment of the right elbow. This joint has developed exactly the symptoms experienced in the left before amputation, namely, pain and soreness on pressure, a steady ache and pain at the joint, inability to move it, and frequent twitching movements of the arm. I took a radiograph of the joint (exhibited) and found exactly the conditions shown by a radiograph of the amputated joint prior to operation, namely, a dark area (negative plate) of the external condyle, due evidently to a deficiency of lime salts of the bone at this point. The father, the patient, and myself were convinced that sarcoma had invaded the bone and its neighborhood.

Treatment by X-Ray.—December 30: No pain since first treatment. January 17: Treatments continued three times a week. Patient reports that elbow feels perfectly normal, and has resumed her normal use of the arm. February 6: Remains normal. February 20: The elbow for the last two weeks presents no symptoms of trouble whatever, and she uses it as usual. Took an X-ray picture to compare with prior X-ray picture of December 28 (exhibited). It will be observed that the dark area (on the negative) is much lighter, indicating, apparently, that the lime salts are again becoming normally deposited in the affected arc of the bone. So far as the evidence is at present attainable, this patient's elbow is cured, but with reservations.

Case II.—Extensive Carcinoma, Inoperable, Recurrent. Pain, Ulcerations, Fetid Discharge, Induration, nodular Enlargements, etc.—Dec. 11, 1901. In July, 1899, patient injured the left breast by a fall from a bicycle; had a sore spot in the lower part of the breast, and six weeks later on noticed a hard lump the size of a pea. In November this lump had become greatly enlarged. The entire breast and axillary glands were removed by Dr. Clement Cleveland. In February, 1900, she was again operated upon by Dr. G. Armstrong of Montreal, Canada, in an apparently most thorough manner. In about one year, January, 1901, two large lumps developed at the seat of the operation, and by September one of these had broken down into extensive suppurative ulceration. The entire left chest, even to the tip of the shoulder, has a tense burning sensation, is rigid with induration, violent red over a space as large as two hands; has some fetid discharge, steady pain, and pain darting into the back; her nights are sleepless; she cannot rest upon the left side. The disease has also invaded the entire right breast, and this is brawny, immovable, as if fast to the ribs, full of pain, it has a retractile nipple, other retractile areas, and various hard nodular projections.

Treatment.—The patient received five treatments in December, and went home for about four weeks for the holidays. She has since received seven treatments. The pain ceased from the moment of the first treatment. It returned slightly during the first weeks, but not at all since January 20. The fetid odor disappeared also at once. Of the two tumefactions, the open one began to discharge very freely, even to numerous small masses of debris, the size of a pea, while the other has diminished much in size. The tense and rigid skin of the chest and seat of the most active disease has become soft and pliable; the feelings of tension, burning and deadness have disappeared. Numerous small nodules have softened and disappeared. The patient reports that so far as her feelings go she would not know that anything was the matter with her. The entire right breast also shows great changes. The retractile areas cannot be found, the angular nodules are rounded masses, the rigidity of the entire breast no longer exists. The hardening is becoming soft. The measurements are reduced one-half. The breast is easily movable.

We have here a case of most extensive carcinoma, in which no operation is possible, and in which the disease is speeding to a fatal termination. The effect of the X-ray, so far as I have gone, has been a remark-

*Read before the Harvard Medical Society of New York City, at its regular meeting, Feb. 22, 1902.

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able amelioration of every symptom, a marked diminution in size of the new growths, and an entire cessation of pain and suffering.

Case III.—Carcinoma of Breast and of Region of Upper Third of Sternum.—Jan. 29, 1902: On Sept. 11, 1899, at the Dewey parade, patient fell and hurt the right breast. A month later she discovered in it a small lump the size of a walnut; next she noticed retraction of the nipple, and found that the breast was considerably larger; then it became painful. Dr. J. Lee Morrill advised excision; also Dr. H. L. Purdy. This she refused, but was treated by an osteopath, who reduced the size of the breast by manipulation. About two months ago discovered she had a "frightful pain" at the central upper portion of the chest, namely, in the region of the upper third of the sternum. This pain is of such a nature that she cannot stoop; it hurts her to extend the arms, to try to sing, or even to breathe. The sternal region gives her a sense of weight and oppression at the spot. Sharp pains radiate outward laterally on both sides, and shoot backward to the upper dorsal vertebral region and beneath the shoulder-blades. Her sleep is much broken on account of pain and the necessity of rising to make applications for relief. Often the pain extends down the left arm, like a neuralgia, to the fingers.

Examination.—Right breast, a rigid, hard, tense, nodulated, immovable, mass, of a bluish surface color; nipple retracted, retractile areas above and below the nipple; several small detached nodules; measurement of hard mass between calipers, vertical five inches, horizontal, five inches. Has pain in the breast most of the time; it is a "dumb" ache, like a toothache. Has glandular enlargements in the right axilla.

"Sternal Symptom."—A flattish, but still distinctly elevated swelling or boss, three inches across in all directions, painful all the time as mentioned, and very painful to the slightest pressure; the elevation is about one-half an inch. January 31: Experienced relief from pain at once in the right breast after first treatment of day before yesterday. Breast softer, and she can button her dress over it without distress. Sternal region neither better nor worse. February 3: Reports that she should not know by her feelings that anything had ever been the matter with the right breast; it is softer, and appears to be dividing into lobes not before noticed. On the contrary, the sternal region gives trouble. It was relieved for twenty-four hours, then "started in again worse than ever"; it hurt to sing, to breathe, to lie down, or to move; compares pain to a severe neuralgia. The swelling is painful to the touch. At once, after treatment to-day, this swelling could be pressed upon without causing pain. The patient exclaimed, "All the pain is gone, and it is not imagination, for it acts so every time." February 5: Right breast. No pain and smaller. Sternum—Relief from suffering for three hours after last treatment, and then return of symptoms. February 7: Measurements of hard mass of right breast reduced from a vertical and horizontal diameter of 5x5 to 4x4 inches; retraction of nipple and all retractive areas no longer exist; several small kernels cannot now be found; nodular projections beneath the skin have flattened out; there is no pain. Sternal region—Great relief for twenty-four hours. February 9: Sternum—Swelling centralized and reduced one-half in its diameter; no longer painful to pressure; can take long breaths, and slept last night without pain. February 10: Similar report. February 14: Relief in sternum lasted twenty-four hours. To-day again pain and oppressive feeling.

A noticeable thing occurred during the treatment which was more than usually striking. At the end of three minutes the patient said, "Why, there is relief now; it is like taking a hundredweight off; there is no doubt of it. I can breathe now; it is the first decent breath I have taken since yesterday." February 17: As mentioned, a severe treatment (five minutes to each side, one foot distance, brilliant X-ray as shown by fluoroscope) was given last time in my desire to favorably affect the sternal region. This morning the skin of the entire chest is very red, resembling a strong sunburn. Right breast; report, "absolute peace and comfort" until this morning, when a slight pain returned. Measurement of mass three and one-half inches horizontally by two and one-half inches vertically; breast tending to flaccid. Mild treatment on account of the skin burn. February 19: The tumor of the right breast is now reduced from 5x5 inches originally to 3½x2½ inches. The sternal boss or flat tumor is reduced from three inches in diameter to about one and one-half inches, but varies in measurement, and tends to centralize to a more distant tumor. The patient has comparatively little pain, and often, for one or two days at a time, none at all. February 20: Right breast, no pain and even flaccid. Sternum gives great pain yet, after the first twenty-four hours of relief is over. Treatment continued; erythema less. The patient was kindly examined for me to-day by Dr. W. B. Coley, and pronounced to be "typical carcinoma with advanced sternal involvement, absolutely inoperable." (Note.—March 1, no pain of any sort since record of February 20.)

Case IV.—Carcinoma of Breast.—February 11, 1902: Mrs. ——, referred to me by Dr. C. Francis Burley. Began five years ago with a tumor and pain in the breast. One year later, a part of the breast was removed by Dr. Augustin H. Goelet. Remained apparently well for eighteen months and then pain and a tumor returned in the original site. Has been having injections of echefolia administered by Dr. Whitney, and also taking this medicine by the mouth. Tumor of left breast three and one-half inches long

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by two and one-half inches broad. An excrescent red growth, size of large marble, at nipple and a discharging opening at lower portion. Tumor hard and nodulated. But little pain. Large lymphatic gland in axilla. February 18: At fourth treatment, red excrescent area, quite pale and brownish; tumor softer and more movable and smaller. February 20: Measurements, three by two inches.

Case V.—Cancerous Tumor of the Stomach.—February 5, 1902: Diagnosis by Dr. Atwell of Hoboken. Symptoms, retching, vomiting, intense pain, located at epigastric region; inability to take food except liquid and hot. Sister died of similar disease. February 18: Six treatments; uniform report that the pain is entirely removed after each treatment, and remains away from six to forty-eight hours; can also take more food. It is noticeable in this as in all cases I have so far observed that the pain is even annulled during the treatment—namely, in from three to ten minutes. February 20: Reports that she has had three successive days without "an idea of pain," whereas before treatment pain was constant daily.

Case VI.—Sarcoma of Side of Head.—January 25, 1902: Miss M——, a case of Dr. W. B. Coley's, referred to me for X-ray treatment. Began four years ago with a swelling in front of the ear; this cut out by Dr. Barnes of Kentucky; one year later, treated with caustic; soon swelling began anew with increased pain. Under treatment with Dr. Coley's serum the now large tumor decreased in size and became more comfortable. At present there is an extensive bony tumor in front of the ear and a soft tumor, about three by two inches, behind the ear; the soft tumor involving also nearly the entire tissue of the ear. The soft tumor has an "angry" appearance and presents a cluster of purplish red, hard, rounded divisions. The principal feature of both the hard and the soft tumefactions is the intense pain and sensitiveness to the touch, causing loss of sleep and necessitating also the use of one-half a grain of morphia every two to three hours. January 29: Third treatment. Reports that last night for the first time in ten months she had great relief and could sleep peacefully; she required no morphia at night and had reduced the entire morphia taken fully three-quarters in amount. January 30: Some return of pain. February 1: Very comfortable; less morphia; slept six hours. Complexion less "muddy." Tumors scarcely painful to the touch. February 4: Both swellings are reducing in size. Finds she can open her mouth to its full extent, whereas she has been previously able to get food into the mouth only with great difficulty, and even has had to force a small tablet of strychnia in betwen the teeth. A previously large gland in the neck is now scarcely to be found. February 7: All of the soft tumor and the ear can be freely handled without causing pain; the soft tumor is also softer and smaller. February 10: Has pain, but very infrequently and much diminished. Continues reduction of morphia one half. February 15: Soft tumor fully one-half reduced in size; looks dry, brown and, so to speak, "drying up." The principal shrinkage is of the upper four-fifths, which is now quite on a level of the unaffected skin surrounding it. February 19: Tumor in front of ear distinctly more conical, due to shrinkage around its base. February 20: Reports "splendid night, not a particle of pain." Morphia taken, when at all, not for pain but from long habit. Merely a small lump of the soft tumor remains.

It is to be noted here that the disease is not outside of the bone, but within, and that, therefore, results are not so rapid as they are when the malignant growth is superficial.

Case VII.—Epithelioma of the face.—Patient referred to me by Dr. Clement Cleveland, December 13, 1901: Miss S., aged forty-four years. A small spot appeared on the left cheek in 1885; treated in 1886; cauterized in 1889; in 1890 broke down and was again cauterized; again cauterized in 1891, and this was repeated in 1893 and 1894. Galvanic electrolysis was used with some success in 1894. Since 1898 has been a large and deep open ulcer, varying in size.

Present Appearance.—Ulcer two inches in length by one and one-half inches wide. A large crater, one inch in diameter, extends with abrupt edges quite to the buccal mucous membrane and to the fibers of the orbicularis oris muscle, which look as if clearly dissected out. The ulcer presents everted and raised pearly edges, hard to the sense of touch. Its central portions are in a state of slough.

For an inch upward on the cheek, beyond the actual ulcer, is an extensive indurated area about ready to break down. Induration also extends outward from the edges from one-quarter to one-half an inch in all directions. The left side of the roof of the mouth is thickened, of uneven contour and indurated and evidently invaded by the disease.

January 15: Induration of the roof of the mouth has now entirely vanished; induration of cheek beneath the unbroken skin is softening and disappearing. Ulcer is reduced about one-quarter in size, and its edges are drawing together, as if cicatrizing—shows healthy granulations. The sloughing spot in the center was shielded by a piece of silver, cut to fit over and laid in over it. Treatments were continued three times weekly, under great difficulties of shielding certain spots and attacking others. February 5: Although doing very well, still to break down several indurated areas a severe treatment (vacuum tube equivalent to a seven-inch air gap, three inches distant, eight minutes

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duration) was given. February 8: Hard nodule at angle of mouth has softened. The entire ulcer, however, looks angry and venous colored, the granulations are dry and, as a mass, flattened out. February 14: As a result of the treatment of February 5, the ulcer has flattened out and reminds one of a dead jelly fish lying on the sand of a beach. February 17: Ulcer looks better and almost no induration can now anywhere be found. February 19: Same.

This patient kindly allows us to inspect the ulcer to-night. (Patient examined by members.) I present a photograph taken about four weeks after treatment began. Also some microphotographs of microscopic sections made by my friend, Dr. J. R. Taylor of Brooklyn. In his report to me he writes, "The microscopical examination of a nodule shows it to be a typical epithelioma." Although the ulcer itself in this case is not healed, it bids fair to most certainly do so; but its healing is delayed in its healthy parts and its healthy granulation tissue broken down repeatedly by the necessity of attacking the deep-seated portions of the disease—namely, the indurated areas beneath the surrounding skin not yet broken down. It is in these areas that the greatest gain has been made in this case.

Case VIII.—Carcinoma of Breast.—January 30, 1902. Patient kindly referred to me by Dr. W. B. Coley. She presents a nodule, the size of a pigeon's egg, angular, and showing angularity where the skin lies over it; to palpation hard and apparently fixed on a rib; has some pain; formed at upper portion of mammary gland. Dr. Coley had performed three removal operations for similar nodules, but the patient would not allow of more extensive operation. He had also used his serum with great advantage, but was desirous of observing the effect of the X-ray. This tumor may be distinctly seized between the finger and thumb and is about three-quarters of an inch in thickness. February 1: Second treatment. No sign of nodulation visible where formerly it pushed the skin outward. February 3: Marked diminution of size of nodule. February 6: One can scarcely find any swelling. February 10: Patient greatly exhausted by social duties and after four days without treatment, returns with swelling slightly appreciable to palpation. February 12: Diminution of size of nodule. February 13: Nodule difficult to find. February 19: Impossible to feel any tumor; none exists; cured, except as to the usual possibility of recurrence.

It is satisfactory that the diagnosis, confirmed by the microscope, and the disappearance of this tumor can be corroborated by our distinguished presiding officer, Dr. Coley, present with us to-night.

The X-ray has undoubtedly rendered a fourth operation by the knife, and that, too, a very unsatisfactory one as regards ultimate recovery, unnecessary.

Other cases are under treatment, including an epithelioma of the throat, carcinomas of the breast and sarcomas, but their histories are too recent to be of especial value to report at this moment, except to state in general that in their cases relief from pain is immediate, and from twenty-four to forty-eight hours at least, in duration, that a reduction in size and hardness is soon apparent, and that the patients, conscious of relief and improvement in their condition, become happy and cheerful.

Observations upon the Above Cases.—Anæsthesia and analgesia, and mode of action.—The salient feature presented by a consideration of the above cases is the immediate and complete relief from pain. This in itself is no small contribution to the treatment of cancer. The X-ray, from this point of view alone, would seem to be preferable to the usual narcotic medicines. The action of the X-ray is frequently as quick as the action of a hypodermatic injection of morphia, and as lasting.

In my opinion, this analgesic action is due to the benumbing of the nerves of sensation. Equally and similarly the remaining nerve supply of the new growth must be benumbed. We have, therefore, a reduction in the force of the total innervation of the new growth.

May it not be that this reduction of innervation results in a reduction in the activity of the growth of the part, and thus leads to a retrogression and cessation of its growth?

This view postulates an atrophy of the new growth due to lack of innervation. But my explanation of the total effect would extend even further than this paralysis of innervation, and would claim that the entire protoplasm of the part subjected to the radiation is to a greater or less extent benumbed in its activity. The result is a retardation of the protoplasmic activity of all the tissues, nerve as well as others. I would term the process a paresis or a paralysis of the protoplasmic activity. Exactly this effect I have produced with the X-ray upon small jelly fish as they moved about in the water of a salt-water aquarium. This paralyzing effect would affect the activity of a micro-organism, if such exist in cancer, as quickly (or perhaps more quickly) than the activity of the new-growth tissue. It would also, probably affect new cells quicker than other ones.

Effect of the Situation of the New Growth.—When the new growth is superficial, or an open ulcer, a simpler problem is presented than when it is internal and covered with sound skin. In the former case the Roentgen radiation may be used with a power that may almost resemble the action of a caustic; in the

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In my opinion, this analgesic action is due to the benumbing of the nerves of sensation. Equally and similarly the remaining nerve supply of the new growth must be benumbed. We have, therefore, a reduction in the force of the total innervation of the new growth.

May it not be that this reduction of innervation results in a reduction in the activity of the growth of the part, and thus leads to a retrogression and cessation of its growth?

This view postulates an atrophy of the new growth due to lack of innervation. But my explanation of the total effect would extend even further than this paralysis of innervation, and would claim that the entire protoplasm of the part subjected to the radiation is to a greater or less extent benumbed in its activity. The result is a retardation of the protoplasmic activity of all the tissues, nerve as well as others. I would term the process a paresis or a paralysis of the protoplasmic activity. Exactly this effect I have produced with the X-ray upon small jelly fish as they moved about in the water of a salt-water aquarium. This paralyzing effect would affect the activity of a micro-organism, if such exist in cancer, as quickly (or perhaps more quickly) than the activity of the new-growth tissue. It would also, probably affect new cells quicker than other ones.

Effect of the Situation of the New Growth.—When the new growth is superficial, or an open ulcer, a simpler problem is presented than when it is internal and covered with sound skin. In the former case the Roentgen radiation may be used with a power that may almost resemble the action of a caustic; in the

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latter case the operator is delayed by the danger of setting up a burn or a gangrene of the sound skin.

That superficial epitheliomata of considerable extent may be cured by the X-ray is now beyond question. Dr. Francis H. Williams of Boston, by his admirable work upon the therapeutic qualities of the X-ray, has convinced surgeons of this. He has reported three cases of superficial epithelioma thus cured. Dr. Wallace Johnson and Walter H. Merrill of Philadelphia have also cured several cases of epithelioma, reported as early as December, 1900.

That, also, broken-down, open and ulcerating carcinomata, as in Dr. Gilman's case of Chicago, or surface sarcomata, as in Dr. Skinner's case of New Haven, and a recent case verbally reported from Brooklyn, N. Y., treated by Dr. Fiske (all undoubted cures), should be cured, is more to be expected for the same reason—namely, that an open surface, or one over which no sound skin lies requiring to be guarded, may receive a severer treatment than skin-covered cases, or cases beneath a sound skin and within a bone.

But that carcinomatous new growths, not yet broken down and still covered by healthy skin, may be dissipated totally, as in Case VIII, and, almost entirely up to date of this report, Case III, is a newer fact and of extreme importance. For we are led to hope by such results that internal cancer, as well as external, may be cured. Corroborating the legitimacy of this expectation is the fact that in the cases reported to-night the pain symptom of internal cancer is relieved just as in external cases, and proving that the X-ray actually reaches and affects the diseased parts.

In fact, one of the great advantages of the X-ray treatment is its far-reaching and general character; for instance, an entire chest may be cleared of disease, if present results are corroborated by further experience, where the knife, however skillfully used, could never search out every possibly affected lymphatic channel.

Method of Treatment.—I employ Ruhmkorff and high-frequency coils and static machines to actuate the vacuum tubes. The radiation from tubes actuated by any one of the three would seem to be identical.

I use the ordinary Jackson focus tube invented by Mr. Herbert Jackson of Kings College, London.

Mr. Jackson placed the platinum anticathode at the angle now employed to direct the radiation out of a Crookes' tube, and deserves this credit, to the exclusion of all the minor names now attached to Crookes' tubes of the Jackson type. Every tube in use to-day for the production of the X-ray is a Crookes' tube, as thus modified by Jackson, and would otherwise be comparatively useless.

Using an oscillatory coil, my average consumption of energy in treatment is three amperes at 110 volts, with a probable frequency of 100,000 to 200,000 oscillations per second. Using a Ruhmkorff coil, my average is three to seven amperes at seventy-five volts. Using a static machine, I use one having ten revolving plates, thirty-two inches in diameter, run at a rate of 300 to 400 revolutions per minute.

Screens may be of "tinfoil" or thin sheet lead. I pay no attention to grounding the screen, nor to insulating it from the patient, as so often strenuously advised. Granting that the electrostatic effects reach and affect the patient, this effect is harmless and a mere modicum of what is intentionally used in daily and beneficial treatments. I do not care to insulate or to ground, for I believe the "burning" is produced by the X-ray, and not by the electricity of the electrostatic field. Proof enough of this distinction is the experimental fact that no burning of a part exposed to the dark hemisphere of a tube occurs, while at the same exposure burning has taken place in the light or radiating hemisphere. Were burning due to the electrostatic impulses the entire tube would produce it, since the entire tube sends forth these electrostatic impulses.

As to the quality of the radiation—namely, differences due to the degree of vacuum in the tube, undoubtedly great physical and therapeutic differences exist—probably much greater than we are now aware of. The low vacuum tube, actuated strongly and near to tissue, can exert a destructive influence in burning and production of gangrene which a high-vacuum tube under similar conditions will not. I prefer a high-vacuum tube (vacuum equivalent to a seven-inch air gap), actuated not too strongly. The quality of the radiation from such a tube produces a blurred and "muddy" definition in the fluoroscope, or upon the photographic plate in contradistinction to the sharply defined image of other conditions of the tube ("soft" and "medium soft"). The blurring is doubtless due to "diffusion" of the X-radiation after impact within the tissue.

But as to the choice of a "soft," "medium soft" or high-vacuum tube, practice must differ according to the case to be treated. Superficial growths, with no intervening sound skin, may be treated by a soft or medium soft tube, while internal growths covered by sound skin are more safely treated with the high-vacuum tube. This is not to say, however, that a superficial growth may not be treated by a high-vacuum tube, and this, in fact, is the method I would at present advise.

It is necessary to emphasize here the great caution required to administer enough of the X-ray, without burning or injuring to the extent of gangrene, the patient's tissue, and yet enough to cause retrogression of the new growth.

The treatment is a hazardous journey between Scylla and Charybdis.

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Uncertainties and Dangers.—1. The absence of a definite measure of the "dosage." 2. The possibility of a "burn" or of gangrene. 3. The difficulty of ascertaining when the "danger point" of administration as regards burning and gangrene is reached.

Conclusions.—What is accomplished by the X-ray? 1. Relief from excruciating pain and constant suffering, often immediately. 2. Reduction in the size of the new growth. 3. Establishment of the process of repair. 4. Removal of the odor, if present. 5. Cessation of the discharge. 6. Softening and disappearance even of lymphatic nodes. 7. Disappearance even of lymphatic enlargements not directly submitted to treatment and often quite distant. 8. Removal of the cachectic color and appearance of the skin. 9. Improvement in the general health. 10. Cure, up to date, of a certain number of malignant growths.—Medical Record, March 8, 1902.

Comments.

The paper is a valuable contribution to the statistics of the X-ray. The full history of the cases, both before and during treatment, the minute description of the malignant growths, the careful diagnosis—all are to be commended. By reference to former issues of this journal our readers will find reports of similar cases by Drs. Burdick, Pratt, Grubbe and Blackmar.

Dr. Morton's theory of the effect of the X-ray on malignant growths will meet the approval of conservative pathologists and histologists who are unwilling at present to regard various forms of cancer as caused by bacteria.

The method of treatment is minutely described. We note with interest that Dr. Morton uses a high tube not driven hard. This method will doubtless induce discussion.

FOREIGN BODY IN THE OESOPHAGUS.

The following case was reported in the July issue of the Brooklyn Medical Journal, the paper being read in a meeting of the Brooklyn Surgical Society:

Dr. Russell S. Fowler reported a case of a girl two years old, referred to him by Dr. Arthur C. Jacobson, with the following history: Her father, while playing with her, allowed her to place a penny in her mouth, whence it quickly passed into the oesophagus beyond his recovery. The parents, expecting the coin to pass, delayed taking the child to their family physician until four days later. The coin had not passed as expected, and the child suffered from inability to swallow solid food, regurgitation being immediate. Liquids passed more easily. There were slight coughing spells from time to time, but at no time was any blood coughed up. As the symptoms were not urgent, no attempt was made by the family physician to definitely locate the penny, he, at that time, believing it would finally pass downward. The child was seen again on May 8, a week after the accident, by which time she had begun to grow somewhat thin and pale. Liquids were easily swallowed and solids fairly well. This was probably due to a slight change in the position of the penny. At Dr. Fowler's suggestion an X-ray picture was taken by Dr. Bender April 10. Chloroform was administered to keep the small patient quiet. Previous to the taking of this picture swallowing had improved so markedly and suddenly that the parents were disinclined to have anything further done. The fluoroscope examination of April 10 showed the coin vertically placed in the oesophagus at the level of the sternal notch. The plane surfaces were antero-posterior, forming a partition on either side of which food could pass. The transition from difficult to easy deglutition was probably caused by the penny swinging into its vertical position. At no time in the history of the case was there any complaint of pain.

On April 10 the X-ray apparatus at the German Hospital was utilized, with the patient under chloroform, to again locate the penny. Its position had not been altered. Dr. Bender assisted at this procedure. Owing to the small size of the patient's pharynx and oesophagus, there was a delay of a few minutes in selecting an appropriate coin catcher. The one found applicable to this case was of slender whalebone, with a small, double swinging basket of silver. This instrument was passed with difficulty, though no force was used. With the fluoroscope the coin catcher was delicately passed to a point several inches below the penny. During this maneuver the child was flat on the back and deeply anaesthetized. With the penny and the coin catcher both in sight, the instrument was gradually withdrawn, during which process it could be plainly seen to engage the penny and carry it along the oesophagus to the pharynx. As the point was reached the child's head was lowered and the coin catcher and its imprisoned penny withdrawn. Length of anesthesia, 15 minutes. The subsequent history of the case is uneventful. The child was kept on fluid food for a few days and then began her usual diet. No bad after-effects of any kind were noted.

While it is not safe to draw too many conclusions from a single case, the following suggested themselves to the speaker: (1) The desirability of complete anesthesia before attempting to remove foreign bodies from the oesophagus. (2) Instruments for introduction into the oesophagus of children should be more flexible than those intended for use in adults. (3) The patient's head should be lowered as the coin is seen to approach the pharynx in order to avoid its dropping into the larynx. (4) Instrumental exploration with the aid of the fluoroscope should precede any

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operative attempt. (5) Exploration must be very delicately done to avoid injury to the oesophagus.

Comments.—We note with satisfaction the conclusions of Dr. Fowler concerning the aid of the fluoroscope in explorations of internal canals where foreign bodies are lodged. The method is also useful in any explorations for deep-seated foreign bodies. The operating table could be placed near an X-ray machine. After a suitable incision has been made the X-rays should be turned on and forceps may be guided at once to the foreign body, the entire process being revealed by the fluoroscope. Much unnecessary disturbance to the uninvolved neighboring tissues could thus be saved.

RECORDS OF EXPOSURE.

The following letter appeared in the April issue of the American X-Ray Journal. Such records proposed now accompany nearly all radiographs. In the early days of radiography operators were slow to explain their technique, but the science is now advancing out of its infancy. The call for experts will not decrease because their work cannot be fully copied. We therefore believe that the recommendations of this letter are good:

Dr. J. P. Hetherington, of Logansport, Ind., in writing to us, concludes his letter:

"It seems to me such a mistake for writers to state they have taken a radiograph in so many minutes. In nearly all illustrations the only record of details given is 'exposure (so many) minutes.' Such a record is no assistance or information for any one. We might as well prescribe a certain dose of medicine for all—babies or adults—without reference to conditions or desired results. The only way a radiograph can be useful to others—aside from a mere illustration—is to give all important details; and I believe you would add to science and the interest of your readers if you would require: Static machine or coil; make or form of tube; tube hard, medium or soft; make or brand of plate; length of exposure, and developer. I keep such a record of every plate I make and it is a wonderful assistance to look over the plates and observe where the results come from. It goes without saying that each tube is always worked with a strength of current that will develop its best radiance. I do not believe we will approach a *standard* any other way. The length of exposure depends upon conditions which, if not given, renders the illustration scientifically useless. I do not believe my German 30-centimeter tube of low vacuum would make a radiograph in five hours that my high vacuum Wehnelt will make in five minutes or less on my eighteen inch coil."

PHOTOTHERAPY.

Dr. P. C. Clemensen discussed the work of Finsen and his associates at the last meeting of the Chicago Electro-Medical Society. He stated that Finsen had come to the conclusion that sunlight is the most effectual in the treatment of lupus, and his electrical condensers are not used on sunny days. Dr. Bohn's lamp is regarded now as a failure. Great hopes had been excited that this lamp would render phototherapy independent of the sun. After two years of experiment a positive electrode for the lamp had been found that would give off a light rich in the chemical rays. At one time a mixture of charcoal and powdered chalk was put into a hole in the end of the positive electrode. This produced a brilliant light. In another form of the lamp a compound of iron, especially iron sulphide, was used as the tip of the positive electrode, and inside the electrode a current of cold water was caused to circulate to prevent the melting of the tip. This light was exceedingly strong. Bang thought it would replace the sunlight condenser. It could produce a dermatitis in three minutes equal to that produced by an arc lamp of 48 volts in an hour and a quarter. In spite of this showing, however, the lamp does not produce therapeutic effects equal to sunlight.

Dr. Clemensen then went on to speak of the results in lupus and other cutaneous infections. He exhibited photographs of three patients taken before and after treatment. These photographs had been sent him by Dr. Finsen. They were all of lesions of the face.

Questions were then asked concerning the technique, which was explained, as published in a preceding issue of the paper.

TREATMENT OF BUNIONS WITH ELECTRICITY.

These painful enlargements are amenable to static sparks and galvanic applications with cocaine. If simply painful, a fine static spark, drawn through the shoe will suffice. Treat for ten minutes or more. In making the static application, a point in the center of the bunion will be found to be anesthetic. Concentrate the sparks at this point until the patient feels the current, when the sitting may close, to be repeated as often as may be necessary. Insulation is not necessary in these cases. The anodal spark has been used as a rule, but as it seems to be the rapid vibrations that are beneficial, either pole may be applied, but the machine must be run with a rapid motion.

If a bunion be very much inflamed, the galvanic anode, with cocaine, may be used to advantage until ready for the static spark.—Philadelphia Medical Times.

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NOTICE.

The Chicago Electro-Medical Society adjourned during the summer months. The next meeting will be held Tuesday, September 30th.

MEDICAL JOURNALS.

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EDITORIAL.

We earnestly recommend our subscribers to read carefully the article of Dr. Morton. His paper was given in the Medical Record of New York, and was therefore well received by the Harvard Medical Society, before which it was read. Careful work will always insure a hearing. The doctor was ready to make simply a report of progress. He thought it not necessary to wait until he could report complete cures, but was willing to let the steady improvement in all the cases speak for the treatment.

We hope that the favorable reception given to this paper will induce our readers to send to us reports of cases. We welcome every full report as a valuable addition to the statistics of the X-ray. We also urge particularly that unfavorable cases may be reported. These are of the greatest value in leading to a decision as to the best method of treatment. Every case means a certain amount of original work, and in preliminary scientific investigation a negative result is of great importance.

EDITORIAL.

One of the early reports giving definite history and exact description of technique was the article of Johnson and Merrill of December, 1900, in the Philadelphia Medical Journal. In that article six cases were reported. The same authors have given a further report of these cases and of a number of others subsequently treated, in the "American Medicine" of Aug. 9. Of the original six cases five were epitheliomas of the face and one was a carcinoma of the breast. Three of the former have remained cured, respectively 2½, 2 and 1½ years, while the carcinoma was not improved.

In a table of results, 27 cases were reported, of which 16 were epitheliomas, involving some part of the face. Ten patients, or 62.5 per cent, are apparently cured; four cases, or 25 per cent, show improvement, and three of these give promise of ultimate recovery; two cases, or 12.5 per cent, failed to derive benefit from the treatment other than alleviation of pain and diminution of discharge. Seven of the cases were carcinomas and all were failures. These cases were all classified as inoperable by the surgeons. One case of lupus of the face was cured. Two cases of Fibroma were not benefited.

The authors hold that superficial epithelioma or rodent ulcer (3 cases of the 16 cases of epithelioma) yield readily to the treatment, but carcinomas should be operated upon early. At best the growth can be only retarded.

The article mentions the fact that because patients do not distinguish between cancers they will apply earlier for proper medical advice, since the knowledge is becoming widespread that certain forms of cancer

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can be cured. Thus the percentage of cures in carcinomas will be greater because surgical operation may be made earlier.

Technique—The authors aim to produce dermatitis as soon as possible, using a low vacuum tube, and discontinuing treatment when necessary to prevent severe dermatitis. They claim that their technique accomplishes in 3 or 4 semi-weekly exposures of 4 or 5 minutes' length what the higher tubes would require 25 to 30 daily exposures of 10 to 15 minutes to perform. They note in common with others that the rays seem to have a selective action for diseased tissues. In a case of epithelioma of the side of the face extending from the eyebrow to the hair and down to the zygoma, the edge of the diseased area showed after a few treatments an outline as clean cut as with a knife, while the dermatitis resulting from the exposures extending beyond this line.

Comments—One is struck at once with the cures produced in few exposures by this technique. Thus the following cases of epithelioma received their respective number of treatments in the corresponding number of days:

Case 1, 5 exposures in 34 days; case 5, 5 exposures in 16 days; case 6, 4 exposures in 10 days; case 7, 5 exposures in 2 months; case 14, 20 exposures in 18 months; case 15, 3 exposures in 4 days; case 17, 7 exposures in 12 days; case 22, 2 exposures in 4 days; case 25, 3 exposures in 18 days; case 27, 5 exposures in sixteen days.

We have selected only the cases reported cured in the above statement and the original report of 62.5 per cent cured speaks highly for the method. It seems probable, however, that the technique is not adapted to the treatment of carcinoma. The experience of other radio therapeutists has been more fortunate. A tube of higher vacuum seems needed for carcinomatous growths, possibly because the "low rays" rapidly force upon the lymphatics too great an amount of septic material.

DIAGNOSIS OF THE PRESENCE OF FOREIGN BODIES IN THE EYE.

In the Philadelphia Medical Record Dr. William B. Sweet gave a summary of 61 cases in which foreign bodies of various substances had lodged in the eye. The X-ray was used to localize them and in every case operated upon the localization was accurate. Radiographs are taken from two different positions, usually at right angles to each other. Two small metal balls placed at different positions with respect to the eye serve as two fixed points on each radiograph. The relation of the foreign body to these points in both pictures locates its position.

In a little more than 50 per cent not only was the foreign body successfully removed, but there was no serious succeeding trouble. The percentage would have been greater had the operation occurred soon after the injury.

Dr. Sweet recommends a large magnet for withdrawing pieces of iron or steel. Often they can be withdrawn through the paths by which they entered. If the body has passed through the cornea and lens it can better be withdrawn through an opening in the sclerotic made in the region where the foreign body has been localized. The small magnet should not be inserted into the substance of the eye because of the injury to the tissues.

If the body has remained for some time in the eye it becomes imbedded in a firm exudate that renders its extraction by the magnet uncertain if not fatal to the usefulness of the eyeball. In such cases it must be removed with the forceps.

PRECANCEROUS KERATOSIS PROBABLY DUE TO THE X-RAYS.

A paper on this subject appeared in the issue of Feb. 1 of the Philadelphia Medical Journal, written by James C. Johnston, M. D. The paper is founded on a report of two cases of X-ray operators, whose hands had become affected by continued use of the rays. That the irritation could not be due to the chemicals used in preparing the negative is proved by the fact that, while the skin on the hands of photographers becomes rough and dry, the evil effects go no further.

In Case 1 the skin was in the dry, scaly condition mentioned above. The patient was recommended to drop photography and was recommended to use diachylon ointment. After a few visits to the dispensary he disappeared.

Case 2 was a surgeon past forty, who had used the X-ray for four or five years. The skin was rough, dry and slightly scaly. The nails were discolored and marked by pits and longitudinal ridges. The main feature was some twenty cornified growths on the backs of both hands.

The larger ones all showed a circumscribed area in the center, where the horny material had crumbled away, leaving a rough, blackened pit. Two of the largest were excised. The first showed a low grade of sub-acute inflammation in the cutis, with a lymphocytosis and a few proliferated fibro-blasts. This keratosis was benign, but not likely to remain so. The second showed in addition a considerable increase of the chromatin in the epidermic cells of the basal layers, mitotic figures and rupture of the basement membrane, with infiltrations of the adjacent corium. The epithelial cells lay between the fibers of connective tissue in strings and small groups. They were round, with deeply staining nuclei and no prickles. The lesion was diagnosed as an epithelioma.

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The wound made by removal of the lesion did not heal. There was left a shallow ulcer with indolent granulations. An arsenic paste was applied, and with the aid of poultices the slough separated, leaving a good scar. The most serviceable ointment was a mixture of equal parts of hydrogen per oxide and glycerin. In time the healing was complete, excepting at one edge of the scar, where the tissue was again excised and the wound grafted. The microscopic sections showed only the keratotic character with firm scar tissue below and no breaking through of epithelial cells. It has not since returned and the other lesions have progressed no further. Dr. Johnston advises the excision of these because they belong to the group of precancerous keratoses.

Comments: These cases are valuable warnings to the too enthusiastic X-ray worker. While we cannot dispute the evidence and the validity of the conclusions in the above cases, we must say that the danger to X-ray operators has now become much lessened since the more efficient apparatus has shortened exposure.

An interesting question arises in connection with these cases. Without doubt the X-ray is a valuable agent in the treatment of epithelioma, causing a cessation of invasion of healthy tissue and a destruction of the infiltrating epithelium.

Would the X-rays have the same beneficial effect on these lesions? Certainly the more or less indirect rays given at frequent intervals caused the lesions, but so many cases of epithelioma have yielded to the direct rays that we see no reason why a like beneficial effect might not be expected. The paper certainly proves that undue stimulation of the X-rays, continued for long periods of time, produces a change in the tissues leading to lesions, which, if produced by some other cause, will yield to the rays.

SUBGLOTTIC SARCOMA REMOVED ENDOLARYNGEALLY WITH GALVANO-CAUTERY SNARE.

The patient was a man fifty-two years of age, in good general health, though his strength was depleted. He had been hoarse for about four months, the last two of which he had suffered from a severe dry laryngeal cough, with occasionally a slight bloody expectoration. His voice could not be raised above a whisper. Laryngoscopic examination revealed a growth below the vocal cords and resting against them, thus preventing their vibration. The tumor filled the larger part of the laryngeal space, leaving only a small opening posteriorly for respiration. The size of the tumor could not be definitely determined by inspection; its resistance to the probe showed it was a dense and compact growth.

The following difficulties were foreseen to the extirpation of the growth per vias naturales:

(1) Possibility of lateral adhesions, making impossible the encircling of the tumor with a snare; the absence of lateral adhesions was proved at a thorough cocainization by exploration.

(2) The possibility of a fragile portion of the tumor becoming separated and falling down into the trachea.

(3) The possibility of a hemorrhage.

(4) The technical difficulty of introducing a sufficiently wide loop through the glottis and carrying it deep enough to slip over the lower surface of the growth.

(5) The possibility of the slipping of the growth from the snare when being brought through the glottis. All preparations were made for a tracheotomy before the laryngeal operation was begun.

Operation—None of the above eventualities took place and the operation was simple and easy. After a few applications of cocaine and a few of adrenalin were made to the larynx and trachea the length of the shank necessary to reach the tumor and the size and shape of the cautery loop were determined. Schech's handle and canula were employed and the iridioplatinum wire devised by the author in 1894 was carried around and under the growth. The wire was tightened very slowly to prevent hemorrhage and the loosening of the growth from the loop by burning through too quickly. The tumor was brought through the glottis without difficulty. The basis was cauterized immediately afterward energetically with a flat burner. The depth of the tumor is proved by the distance of 4¾ inches from the vertical bend to the lower end of the loop.

Subsequent history—No ill sequelae followed the operation and the patient's voice began to improve the next day. A small stump remaining was removed about three weeks later and the basis cauterized as before. The heated snare did not injure the cords at either operation, and the voice became as strong as before, with a light shade of huskiness. There has been no recurrence for four months.

Microscopic section—A section was made by Dr. Heitzmann, who reported that the different portions presented somewhat different aspects, being partly pure round-celled sarcoma, both small and large, partly myosarcoma, and partly showing even a commencing alveolar structure.—(Abstract of a paper in the N. Y. Medical Record of July 5, 1902, by J. W. Gleitsmann, M. D., of New York.)

Comments—The success of this operation shows the value of the galvano-cautery snare for the removal of malignant growths wherever the location is suitable. The operative surgeon should always prefer removal per vias naturales to an incision. In this

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case everything was favorable to the course pursued, and the quick recovery was gratifying.

All X-Ray operators, however, would feel that the patient should have a course of X-Ray treatment after the operation. It would insure non-recurrence. A number of cases of sarcoma, first removed surgically and then treated with the X-Ray, have been reported as giving no evidence of return. The raying can be given as soon as the patient is able to take the treatment, as mild raying does not retard the healing process.

THE PATHOLOGY AND THERAPEUTICS OF THE ROENTGEN RAYS.

The Roentgen Rays produce certain characteristic changes in the skin which somewhat resemble a burn, but with this marked difference that there is a latent stage, a variable period of time between the application of the rays and the appearance of the burn. We can conveniently classify burns under three forms. In the first degree are to be included all cases of slight erythema: The skin becomes hyperemic, and after an interval, changes in color to dark-brown and peels off in dry scales. The tissues recover with or without pigmentation. The bullous form of burn has also a latent period as do burns of the first degree. In this form are to be classed all burns in which there is more or less superficial sloughing. The pain here may be severe. After a period of cicatrization and pigmentation the tissues slowly return to their normal condition. The most severe and disastrous form of burn is the necrotic form. This results after long-continued exposures when the tube is placed near the patient. It has a long latent period—often six weeks, a period during which there is no apparent effect from the rays. Suddenly the tissues become pigmented and after a short time become necrotic, often to a considerable depth. This burn seems to be a kind of stationary form of gangrene. On recovery there is noted a permanent change in the tissues. Toxemia often results from the absorption of the products of disintegration.

Treatments—For the first form, Burrows' solutions are most comfortable. Any soothing ointment will answer the purpose. For the second form, after the blisters are opened, use a xeroform gauze dressing, later a ten per cent xerform-lanolin ointment, changed daily. For the third form the mortified tissues must be first excised and must be treated with surgical dressings to produce granulation and cicatrization. In the later stages of recovery the treatment for the earlier stages may be resumed.

Susceptibility—Among the great number of cases exposed, some seem practically immune to the rays. In some of these, however, burns have developed most unexpectedly. This fact has been noted frequently by operators who had felt themselves not susceptible. Blond individuals seem predisposed to tissue changes. Children and weak patients show a more intense reaction. Certain parts of the body are more susceptible than others.

Effects on Histologic structures—Experiments on animals show that the red blood corpuscles may be destroyed under intense and long-continued exposures, and that tissues may disintegrate, forming albuminose and peptones. Reports of experiments have been made, proving a leucocytosis in a patient under mild raying. The rays have antiseptic properties, all kinds of infusoria perishing after six hours of irradition. The rays may also counteract the proliferation of cells, as proved in the numerous reports on the treatment of malignant neoplasms.

Method of treatment—The application for therapeutic purposes should be made with great care, the first few treatments being very mild until the relative susceptibility of the patient is revealed. He should be warned of the danger of burning and be allowed to assume his part of the risk. The first three exposures should be made at intervals of a week and should be about five minutes in length. If no signs of inflammation appear, the exposures may be given more frequently and increased in length. They may last forty-five minutes and be repeated daily in desperate cases. The tube is placed close to the body of the patient. The uninvolved tissues are protected by lead or tin-foil screens. Tubes of low vacuum are generally used as the rays of hard tubes more strongly affect the deeper tissues.

Pathologic conditions benefited by the treatment—A case of sarcoma was much improved, but not cured, owing to the exhausted condition of the patient before the treatment. A case of lupus has been cured for three years, with no recurrence.

The treatment is fine in Sycosis. The X-Ray is without doubt the best treatment for large haired surfaces. A general depilation is easily secured and under proper treatment there will be no recurrence of the growth. Electrolysis can be used on small areas.—(Abstract from an article in the New York Medical Record of Jan. 18, 1902, reported by Carl Beck, M. D.)

Comments—The above is the first attempt we have seen to divide X-Ray burns into classes. We fully indorse this classification, although its boundary lines may not be always distinct. In the bullous form of burn there may be some necrosis of the tissues which may slough off without the need of surgical operation. But in the true necrotic form of burn, surgical treatment is essential. We have noted in another article that a kind of precancerous Keratosis may be produced in the skin of operators who may have experi-

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enced a burn at no time in the use of the rays. This form of lesion occurs mostly on the hand.

We do not know upon what reports Dr. Beck bases his statement that the X-Rays are antiseptic and that infusoria of all classes are killed by them. Nearly all reports give negative results. In some cases the bacteria seem to multiply more readily under the rays. In a late issue of the New York Medical Record the experiments of Rieder are referred to as conclusive regarding the bactericidal effect of the X-Rays. Even so, the exposures were much longer than can be given to patients, and the curative power of the rays must be traced to a different source. The results of treatment upon embryonic tissue certainly do prove one fact: that the cell proliferation in such tissues is inhibited, while the cell proliferation of the adjacent normal tissues is possibly stimulated.

We note with interest the technique of the treatment. Few operators place the tube so close to the patient. Dr. Beck insures against a burn by the initial treatments being given at intervals of a week. Other operators place the tube farther from the patient and give the treatments on alternate days from three to five minutes in length. His reports show,however, great success in the treatment of the various pathologic conditions which yield to the X-Ray.

PRIMARY EPHITHELIOMA OF THE UVULA AND SOFT PALATE AND TREATMENT WITH THE ROENTGEN RAYS.

The patient, a woman 37 years old, presented for examination a mass involving the uvula, velum palati, each posterior faucial pillar, the right lateral wall and a part of the posterior wall of the pharynx; the other surrounding tissues seemed normal. The mass had an ulcerated, necrotic surface. The cervical muscles were somewhat sore and stiff, but no glandular enlargement could be detected. The patient had lost weight, but her general condition was good. Microscopic section of the growth revealed epithelioma.

The extensive involvement of the faucial and pharyngeal structures made an extensive radical operation impossible. It was decided to remove as much of the growth as possible without destroying the function of the parts and subsequently use the Roentgen Rays.

Operative treatment—The patient was anaesthetized and the growth was excised through the mouth as freely as possible with the electro-cautery knife. The ulcerated areas on the pharyngeal wall were vigorously curetted and afterwards cauterized. After four or five days the eschars began to separate and the wound to show signs of cicatrization. Mild antiseptic washes were used for two weeks when the reaction following the operation subsided and the raying began.

X-Ray treatment—A German tube, with vacuum having a resistance equal to a 2-inch spark gap in multiple, was excited by a static machine of 16 plates. The machine was run as rapidly as safety allowed. Treatments were given three times a week for seven weeks. The first three exposures were 12 minutes in length, the next four being 15 minutes each. The subsequent exposures were reduced to 10 minutes, owing to the burning of the throat.

The entire face and neck were protected by a sheet of block tin, leaving an aperture of 1½ inches diameter for the mouth. Into this was inserted a tube of block tin, two inches long. This acted not only as a protection to the mouth and tongue, but served as a tongue depressor. The patient was placed on her back with her head but slightly elevated. The X-Ray tube was placed as close to the mouth as possible, the most direct rays passing through the tube against the pharynx and soft palate. There was some tanning of the nose and forehead and a slight conjunctivitis.

Effects of the treatment—At the end of the first week the patient reported that soreness was almost entirely gone. At the end of two weeks the healthy part of the fauces showed signs of dermatitis where the most direct rays came in contact with the mucous membrane. The nose commenced to tan and the patient complained of dizziness and fulness in the head, which would keep her awake most of the night. She also complained of a peculiar smarting sensation in her throat. The diseased areas were now in a state of healthy cicitrization. At the end of five weeks the throat seemed entirely healed on direct inspection. Examination with the mirror showed ulceration on the upper posterior surface of the soft palate, a part which the direct rays could not reach. The rays were now directed upon the velum palati and the healing progressed slowly. At the end of seven weeks only one small area, the size of a split pea, remained unhealed. The patient became careless and did not return for three weeks. There was then marked increase in the area of ulceration and infiltration of the velum palati, with extension to the right lateral and posterior pharyngeal wall, with soreness and stiffness of the cervical muscles on the right side.

Second operation and course of treatment—The growth was thoroughly curetted and cauterized with the electro-cautery. A portion of the growth on microscopic section confirmed the previous diganosis. There was a new pathologic condition, however, in this specimen; a very rapid colloid degeneration of the epithelial cells, the protoplasm of which was almost entirely replaced by colloid material.

Irradiation was resumed three times a week, with twenty-minute exposures for five weeks, followed by treatments once a week for seven or eight weeks. Cicitrization progressed kindly, with a minimum of contraction from the first. Even this slight contraction of the velum has now fully relaxed and the parts

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now functionate perfectly. There is nowhere to be seen any indication of infiltration.

General remarks—The rays were directed especially upon the younger, or formative, cacinomatous tissue, with the idea that the rays would have greater effect upon primitive than upon well-formed cells. Though it is perhaps unwarranted to claim that the rays produced the colloidal degeneration in the epithelial cells of the second specimen noted above, the fact is at least of great significance in lieu of the satisfactory result of irradiation. Surgical measures alone would have doubtless met with quick recurrence, and radical operations, with their mutilating effect and destruction of function, are unnecessary.—(Abstract of a paper by James Frances McCaw, M. D., of Watertown, N. Y., in the New York Medical Journal of Aug. 9, 1902. The raying was done by Dr. C. N. Bibbins of Watertown, N. Y.)

Comments—The author of the paper states that the technique described by Carl Beck, M. D., was used. The tube was placed as close to the mouth as possible and the vacuum was low. A somewhat surprising feature of the recovery was the extreme reluctance to heal of the diseased part on the soft palate. At most, the rays had to pass only through a thin muscular septum before reaching this area. On discontinuance of raying the infiltration of neighboring tissues was rapid. This is quite a different history from those of a few other cases, where the healing process continued after the cessation of the treatment, where the tissues were much further from their normal state. These last cases, however, must be considered unusual and operators will prefer to continue the irradiation until the tissues have fully recovered. We note with pleasure the final condition of the parts, a condition so common in reports on X-Ray treatments,—absence of hard cicatricial tissue, perfect functioning of the parts.

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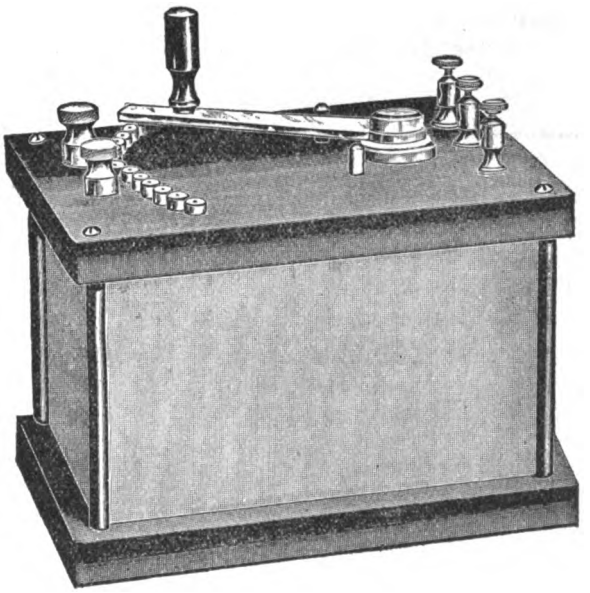
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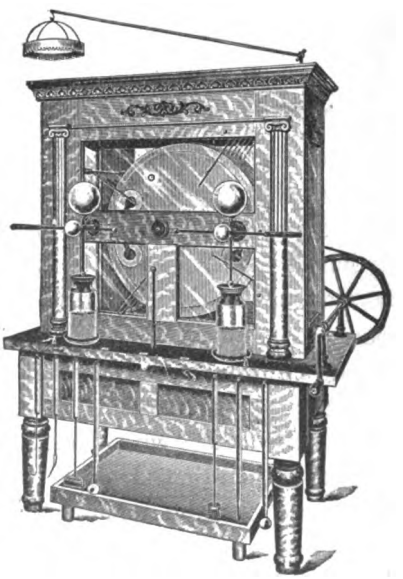
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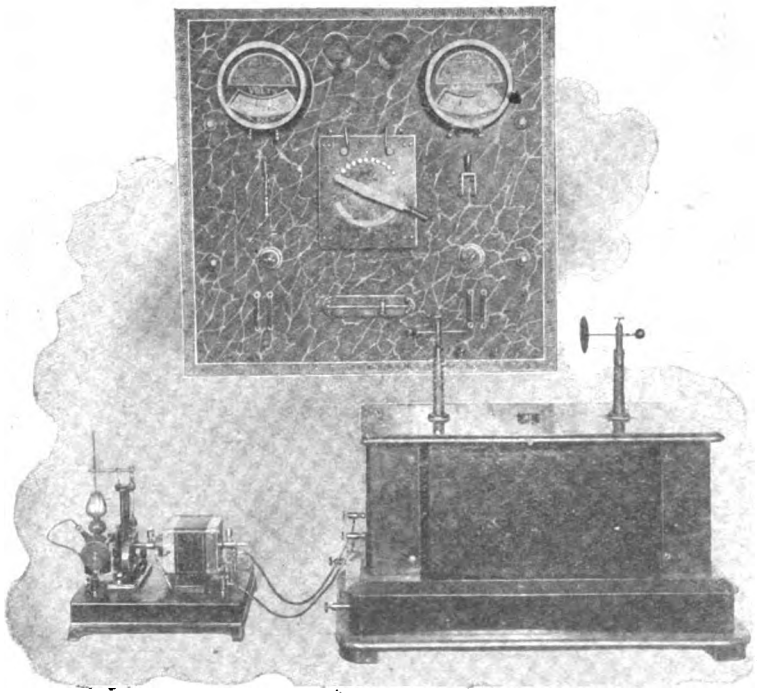
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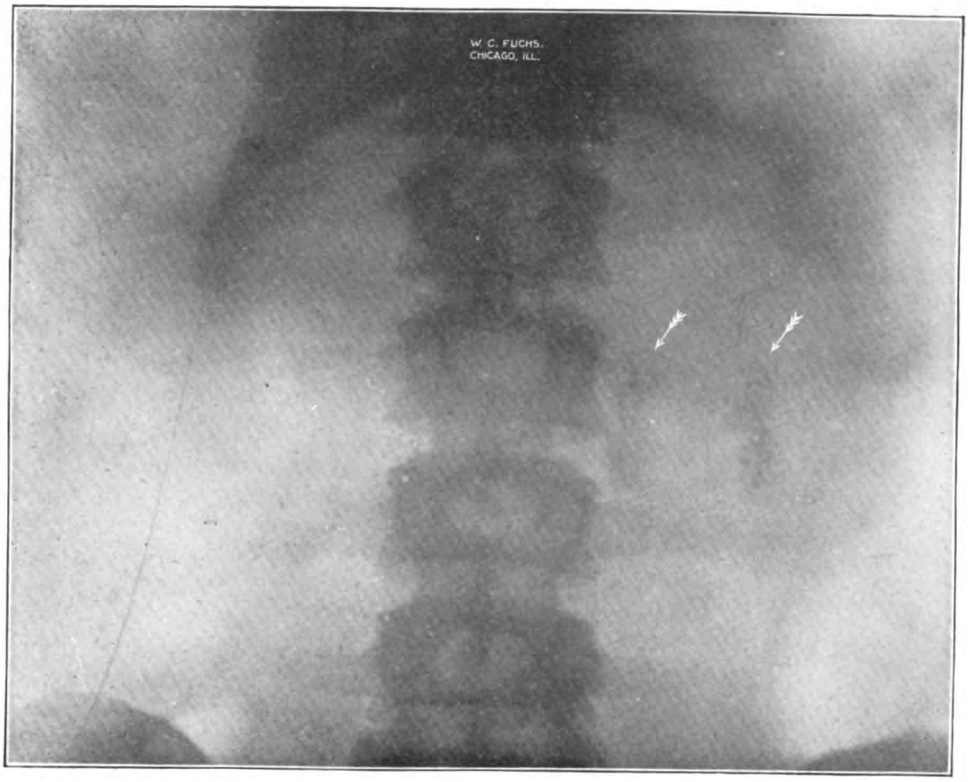
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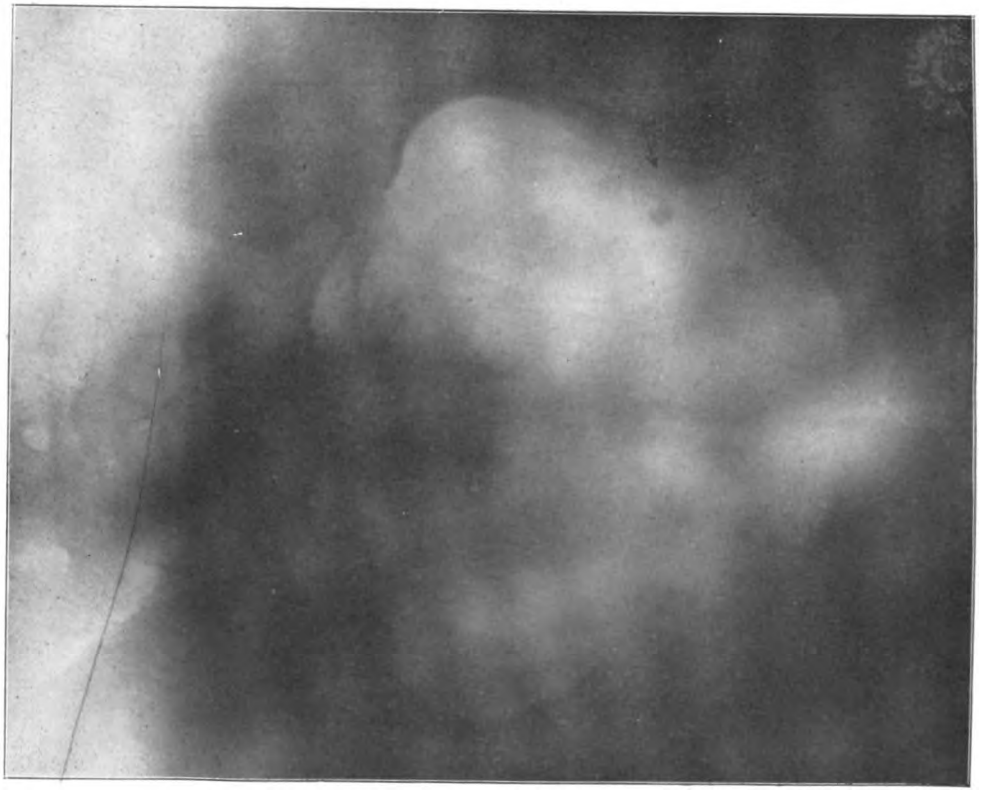


CASE 1.

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CASE 2.



CASE 3.

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Electro-Therapeutic and X-Ray Era

A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, SEPTEMBER, 1902. No. 9.

ORIGINAL CONTRIBUTIONS.

X-RAYS IN THE DIAGNOSIS OF CALCULI IN THE KIDNEY, URETERS AND BLADDER.

With four half tone illustrations.

The value of the x-rays in detecting calculi in the urinary tract is now well recognized. The following cases are quite typical of the symptoms accompanying such cases. Particular attention is called to the absence of distinctive derangement of function in case III. The histories were kindly given by the physicians referring the cases for skiagraphing.

Case I.—W. L.; male; 53 years old, widower; weight, 160 lbs. Health heretofore very good; had gonorrhea twice. Of late has had occasional pains on the right side, passing down to the penis, ureter and thigh. The patient is suffering from thrombosis; is weak and dizzy.

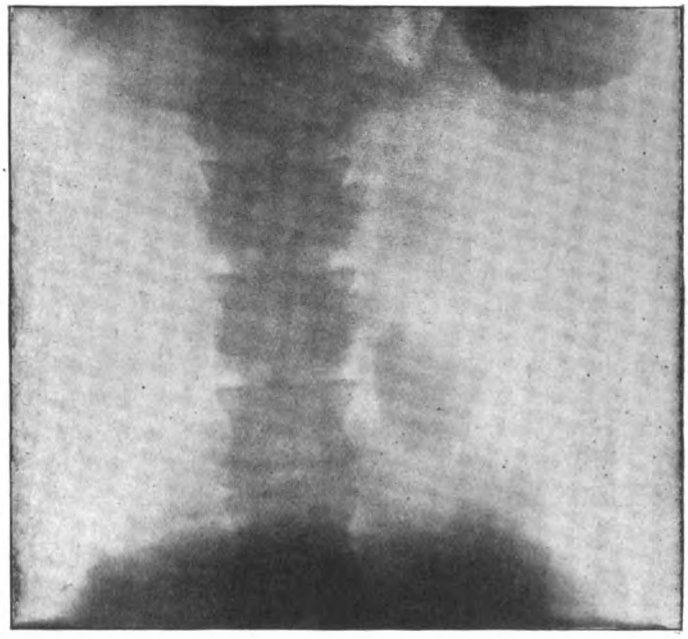
Examination.—Severe pain on palpation in the right lumbar region. Urine negative; radiograph shows two stones in the kidney.

Case II.—F. C.; male; age 27; married. Had usual diseases of childhood. Seven years ago had syphilis. During childhood had pain in the side and back, especially after play; in later years after heavy work. Has pain in the region of the kidneys. Urinates frequently; sleep broken.

Examination.—Inspection and percussion negative. Urinar analysis showed albumin, no blood. Radiograph showed two stones in the kidney and two in the bladder. The latter radiograph is not shown.

Case III.—Dr. M.; 35 years. Diagnosis stone in the kidney. Skiagraph negative. A skiagraph of the hypo-gastric region shows two stones in the right ureter, three in the left ureter and one in the bladder.

Case IV.—Mrs. W.; middle aged; fleshy; in good health until two weeks ago, when pain in the left side set in. X-ray shows large stone in the kidney; operation; recovery. The slight amount of pain was probably due to the small amount of injury done the organ due to the unusual size of the stone.



Case IV.

Technique.—The patient should be kept on a liquid diet for twenty-four hours previous to the skiagraphing. An enema should be given immediately before the exposure. The patient is placed on his back, being upon the plate with the tube above. I use a medium tube, adjustable vacuum. The distance between the plate and tube 16 inches. I prefer a Carbutt x-

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ray plate and use the metol hydrochinon developer recommended by them.

Several radiographers state that it is of great importance to develop for the stone, and say that the plate should be carefully watched for the appearance of the calculus. I do not pay attention to this point, but develop the plate to the right point as I would for plates of normal conditions in this region. In the first place, a phosphatic stone will be opaque to the rays and will appear prominent in the development, but if it is a uric acid stone it will be invisible until after the negative has been fixed.

The tube is of fundamental importance. Not every tube of the same vacuum will answer the purpose. Some medium tubes send out only weak rays; now and then a tube of medium vacuum will generate powerful rays. Such a tube is required for this work. I used a 12-inch coil with a rotary make and break interrupter. The length of exposure should be short; two or three minutes at the most.

W. C. Fuchs,
Schiller Building.

ROENTGEN RAYS IN A CASE OF NEURASTHENIA

Every single case, although considered alone, is without much value, but in combination with others helps to clear the mystery of our new powerful therapeutic agent and to confine the boundaries of its usefulness. For this reason I report the following case, though the relief gained by the X-ray was only transitory and the patient is still under observation.

N. B., German, 60 y., collector. Anamnesis: Father died over 80 years of age, mother at the age of 45 of "change of life." Two brothers are well, one brother is insane for twenty years (in Germany).

1866.—When serving in the German army he was hit by a horse on the forehead, fell down unconscious, but was able to walk to the hospital. After two weeks he was well again. Scar visible on forehead.

1868.—Typhoid fever in this country.

1892.—Treated for shrinkage of the liver; was laid up for several months.

1898.—June—sunstroke. In bed for a couple of days, but unable to attend to his business for five or six months.

1899.—May—Sunstroke. Confined to the bed for three months. Started to work again, but did not feel well enough.

1900.—Worked off and on; was treated by different physicians; took medicine, electric treatments, Russian baths, etc.

1901.—August and September—Was treated in the Alexian Brothers Hospital, mainly cold baths and massage; left unimproved. Stopped doctoring since then, taking patent medicines.

1902.—May 8. Came under my care. Complains of constant pains in his head and bad dreams at night. On examination nothing abnormal could be found; no anesthesia, no hyperesthesia, reflexes normal, also the internal organs. Temperature normal, urine normal. During May and June he received forty treatments with the static current, generally positive insulation, negative breeze and spray on the occiput with the wooden electrode, occasional sparks on the spine, legs and feet.

After each treatment there was an improvement. He was free from pain for a certain length of time, generally from three to five hours, sometimes for twenty-four hours. But the old trouble always reappeared. After trying some strychnine in the first part of July with negative result, also methylene blue, I decided to use the X-rays.

July 15, first X-ray treatment for ten minutes hard tube, distance fifteen inches (from anticathode to vertex). He noticed immediate relief, which lasted thirty-one hours. During that time the pains in the head disappeared, the weakness in the limbs showed improvement, but was not entirely gone.

July 17.—Second X-ray treatment, ten minutes. During the radiation he noticed the same change, which lasted until July 19, 5 a. m. In the night from the 17th to 18th he dreamed less. Immediately after the radiation he felt a burning sensation through the hair roots and the occiput lasting until evening. Some shooting pains through the limb on the 18th, but shorter attacks than usual.

July 19.—Third X-ray treatment, fifteen minutes. Relief after five minutes. The head feels comfortable, but as if there was a twitching in each hair root. At 11 a. m., three hours after the radiation, the pains returned.

July 21.—Fourth X-ray treatment, fifteen minutes. Relief for three hours.

July 22.—No treatment. Patient says this was his best day for a long time. He was perfectly free from pains.

July 23.—Fifth radiation, fifteen minutes. Relief for three hours. The relief after the first two radiations lasted much longer than after the last three. In the first two radiations the rays struck the head from above in a vertical direction. The patient complaining of feeling the least relief in the region of the neck, I changed the direction so that the rays struck the patient in a horizontal direction. Thinking this might account for the difference, July 25, in the sixth exposure, I first made use of the horizontal rays for fifteen minutes and then of the vertical for five minutes. Relief for five hours.

July 27.—Seventh exposure, twenty-five minutes. Target above the patient's head, 15 to 16 inches. Feels very good after exposure for over twenty-four hours, but then as bad as ever. Sleeps well, but with bad dreams.

July 29.—Eighth exposure, twenty minutes. Feels "as if he could go to work." After ten minutes, how-

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ever, the whole effect is gone. Pains through the whole body.

July 30.—Patient has profuse diarrhoea, something he never had before.

July 31.—Ninth X-ray treatment, ten minues. Anticathode vertical. Feels as if he could work, but after less than an hour he feels as bad or even worse than ever. Pains in the whole body, mainly in the occiput and the right arm. Diarrhoea a little better, but not gone yet.

For the last five or six days an eruption and boils over the whole body, principally on the head.

On Aug. 2, 3 and 4 profuse diarrhoea, stronger pains.

Aug. 4.—Static treatment for seven minutes. Feels a little easier in his head, but not so clear as after an irradiation.

Aug. 5.—Static treatment, seven minutes.

Aug. 6.—Notices some effluvium capillitii.

Aug. 7.—Diarrhoea much better. Pains in the head better, but he thinks that the disease has spread over the entire body.

Sleep is pretty good, but always "dirty dreams."

Ulcers on the head dried up. Small ulcer on the upper lip; disappears after about ten to twelve hours.

Static treatment six minutes relieves his condition. He finds that now, after the X-ray exposures, the static treatments are more effective.

Aug. 8.—Three boils in the right axilla. Pains along the spine and the lower extremities. Diarrhoea better.

Aug. 9.—X-ray exposure two minutes, thirteen inches, gives relief. Patient states that he feels the effect in the boils in the axilla.

After the radiation static treatment for five minutes gives more relief in the back and the legs.

Fifteen minutes later the entire effect of the treatment was gone. Had to stay in bed on the 9th, 10th, 11th and 12th.

Aug. 13.—Comes to the office; feels weak. No treatment.

Sept. 10.—Has had no treatment except some opium and bismuth for his diarrhoea. His condition is now about the same as it was before he came under my care.

Sept. 11.—Skiagraph of skull taken. Exposure one and one-half minutes. Relieved his condition for some time. The skiagraph shows nothing abnormal.

100 State St. A. DECKER, M. D.

RADIO-THERAPY FOR CANCER AND OTHER DISEASES.

The paper was contributed by William T. Morton, M. D., in the New York Medical Record, May 24, 1902. On account of his results published in a previous issue, radio-therapists will be interested in his technique. We accordingly make the following abstracts:

"1. Technique.—The therapeutic use of the x-radiation is based upon the fundamental fact that this radiation exerts a specific influence upon the life processes of animal and vegetable tissue. This influence is beyond dispute. It is most openly manifested when exerted upon the integument, but laboratory experiments show beyond question that small animals, like mice and guinea pigs, weeks after irradiation, unnoticed by them at the time, suffer internal structural changes which even end in their death. The structural changes may be demonstrated post mortem. They are invariably of the type of ordinary inflammation. Kaposi, indeed, expresses the view that all the changes thus far noted, whether of the integument or internal, differ in no wise from common inflammation. Dr. Carl Beck reports that in the case of mice irradiated by him the autopsy showed congestion and microscopically signs of inflammatory changes in the viscera. Tarchanoff has reported that mice, guinea pigs, rabbits and birds died after prolonged irradiation, exhibiting paralytic symptoms.

"The sole point I wish to emphasize here, and it is an important one, is that radiotherapy is by no means, as seems to be commonly believed, to be confined to exterior and superficial diseases and conditions, but is equally applicable to diseases of the interior, like cancer, and, in general, to internal diseases.

"It is the x-ray itself which sets up dermatitis, produces necrosis, or, when properly used, cures disease. The cathode rays do not escape from the vacuum tube. I cannot believe that, as claimed, the electric pulsations given off from the tube exert a harmful influence. On the contrary, I believe that they benefit the patient, in accordance with the well-known laws of the therapeutic effects of high-potential currents. In this respect, indeed, they should act as an offset to any baleful influence of the x-ray, and possibly, at times, to its curative influence. Regarding the electric vibration, therefore, in this light, I do not consider it essential to employ an aluminum grounded screen, or if I should employ the screen it would be for the purpose of cutting off the beneficial, not the harmful, effects of the x-ray.

"The x-ray from the soft tube possesses but little penetrating power; its shadow picture presents 'black bones'; its radiation is quickly and superficially absorbed by the tissue; it has slight therapeutic value.

"The x-ray from the medium soft tube transforms most of the electrical energy imparted to it into x-ray energy; its shadow picture is sharply defined and the one most commonly desired and obtained; its radiation has a good penetrating power, though much of it is absorbed by the integument; it should, therefore, be employed when we wish to produce an effect upon the skin.

"The x-ray from the hard tube possesses the most highly penetrative power; its energy is not lost in

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superficial tissue, but is expended on the deeper tissues; it should therefore be employed when we wish to affect the deeper parts of the body.

"The sole point to weigh, I imagine, as to the entire question of vacuum is, at what part of the patient's body do we wish to have a transformation of x-ray energy into chemical energy. If in the integument, then we would use a medium soft tube; if deeper, a hard tube. Personally, I may say, I lean in my preference toward a hard tube in all my treatments."

"The time of exposure depends primarily upon the intensity of the x-radiation. Our effort should be to standardize every step of treatment. If we use a coil we must know the volts and amperes and number of interruptions per second; if a static machine, the number and diameter of the plates and the number of revolutions per minute. With these data and established and constant quantity, we should adopt a standard of intensity of x-radiation, a standard distance of the tube from the patient's skin and a standard duration and frequency of application.

"Instruments to measure fairly well intensity of penetration have already been devised, based upon Professor Roentgen's original suggestion, and we may soon be able to buy them.

"Roughly speaking, I select a tube just beginning to be hard (corresponding to from five to seven inches spark-gap of the coil), giving a good photographic picture of the hand in one minute at a distance of two feet, and equally clearly giving a good fluoroscopic outline of the skeleton of an average man at the same distance. I select a distance of eight inches and a duration of from six to eight minutes, and give it treatment three times a week. In this manner, where sound skin intervenes, I usually get a dermatitis of a mild type in from one to two weeks. This dermatitis I do not fear, but, on the contrary, anticipate producing. But now, instead of stopping treatment, I go right on (shifting the central focus of the tube, however, often) until I have converted a bright erythema into a brown and often, in brunettes, into a blackish 'tan.' The patient once properly 'tanned,' it is extraordinary how great an intensity of x-ray may be administered. In some of my patients whose skin is already tanned as black as a dark mulatto's, I am giving treatments of from eleven to fifteen minutes, three times a week, with no harm to the skin. I think the effect is exactly the one aimed at by the bare-backed and bare-armed oarsmen who systematically tans his body. Daily and short exposures to the sun soon enable him to defy its hottest rays, whereas one single, first and long exposure would set up blisters and ulcerations and cripple him for weeks.

"However, I wish here to distinctly put myself on record as refusing to advise any one else to 'tan' a patient with the x-ray. It is a process that each must judge for himself and decide accordingly. It is mainly, however, a question of systematic and standardized technique. It is commonly advised, I am well aware, to cease treatment as soon as dermatitis sets in, but for the reasons given above I have discarded this advice. After the skin has been hardened, say at the end of two to three weeks, I give ten to fifteen minutes' treatment three times a week. In cases of internal cancer it would be impossible to succeed unless we could continue in spite of the erythema and tan the patient as described. On the whole, as to frequency and intensity of treatment, I would say feel your way along the first two weeks; force your way the next two weeks and after. And, following this general advice, certain cases of exterior cancer, or interior cases, where the same area of skin is not necessarily constantly subjected to radiation, may be x-rayed more frequently, and even daily.

"Finally, as a last word in regard to technique, I cannot protest too strongly against the submission of a patient to x-ray treatment by unskilled hands.

"The outfit, like the surgeon's knife, is a simple one, but the outcome, in the hands of the immature operator, is as if the surgeon should turn over his scalpel to the nurse. It is the state of the vacuum and the consequent quality of the radiation produced which is both the fickle and the dangerous feature of administration. At one moment with one tube a radiation flashes forth which cuts down animal tissue as does the hot wind of Sirocco cut down plant tissue life. At the next moment, or with another tube or vacuum, a deceptive ray glows to the eye at the fluoroscope, and yet has little or no effect upon the disease. There is always some danger, even in skilled hands, and likewise uncertainty enough, but in unskilled hands the danger is as unpleasant to contemplate as is the report of results obtained—valueless.

"In such hands a negative result has no meaning, an affirmative result is an accident. It would be wise if a school of instruction for x-ray workers could be established.

EFFECTS OF EXPOSURES.

"There is no evidence to justify the assumption of an idiosyncrasy on the part of the patient to dermatitis, ulceration or necrosis. We should, however, keep in mind that the skin of the face and hands is more susceptible than that of other regions, that the mucous membrane is more sensitive to the ray than the skin, and that areas of existing inflammation are the most susceptible.

"The general effect of an exposure is, as has been said, to produce, when carried to extremes, the common symptoms of inflammation. When not carried to extremes, or when used within other therapeutic limits, I suppose the effect to be due to a reaction in the vital tissue processes (metabolism), ascribable to having set up new chemical exchanges. If metabolism is the sum total of all the chemical exchanges which

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take place in a living animal organism; and if, secondly, the x-ray effect is a transformation of x-ray energy into chemical energy, then the conclusion seems inevitable that the effect of the ex-ray in the cure of disease is due to a primary chemical reaction, affecting in turn the metabolic processes. How far the dissociation of the common atom and the molecule into the ion enters into this explanation should be in time easily demonstrated. For my own part, I believe that scientific analogy points to the action of the x-ray as one of ionization. X-ray dermatitis and necrosis are too familiar to require description here.

"I have noted two rather constant reactions in the treatment of cancer. The first, occurring in general carcinomatous infection, may be termed an early reaction period. In this the temperature may rise from 1 to 2 degrees F., the pulse is increased in frequency, and the patient experiences 'nervousness' and unrest and an increase of general fugitive pains. But the rule is an immediate cessation of pain, and within a few days the disappearance of small nodules, to be followed by the later reaction next referred to.

"The late reaction is local and shows itself at any time in from one to three weeks, and seems to resemble in this respect the familiar effects of dermatitis. This reaction is in reality the first objective evidence of a retrogression of the new growth (carcinomatous or sarcomatous tumor).

"Cases of failure to secure any improvement in sarcoma within eight or nine days have been reported. In all such cases the lateness of a possible reaction must be kept in mind.

ILLUSTRATIVE CASE.

"Carcinoma of manubrium of the sternum reported by Dr. C. B. Ferguson, president of the British Medical Association. The cancer consisted of a tumefaction and open ulcer, treated daily for twenty days without signs of improvement. Patient returned after several months with all evidences of cancer gone.

II. INDICATIONS AND OBSERVATIONS.

"The x-ray worker from his standpoint, may classify his cases naturally, according as they are: (1) Exterior; (2) Interior; (3) Operable; (4) Inoperable.

"1. Exterior.—When the disease has involved the skin, or the skin has broken down, the case is exterior. When, on the other hand, healthy skin covers the new growth or other disease, the case is interior. The operable and inoperable classification explains itself.

"In exterior cases, as for example, of epithelioma, papilloma, rodent ulcer, lupus, etc., the effect of the radiation may be closely watched. A shield protecting the sound skin is desirable, though I see no reason for insulating it.

"In this class of cases the indications of experience thus far gained fully justify a resort to the x-ray in preference to any other treatment. True, a small and isolated epithelioma may sometimes be preferably cut out or scraped out or be treated by caustics, but, on the other hand, cases of large areas of destructive and advancing epitheliomas and lupus have already been reported in great number, where nothing yet known except the x-ray would have saved the patient from extensive surgical mutilation and possible death.

"2. Interior.—In interior cases the operator's hands are tied, and his efforts are limited by the fear of breaking down the normal and intact integumental tissue. It is here that the 'tanning' process may be resorted to, as, for instance, in osteosarcoma, and in carcinoma of the breast and other tumors either immediately or remotely underlying the skin. In these cases the high-vacuum tube, with its deeply penetrating x-ray, is indicated.

"And in these cases, I have no hesitation in claiming that the x-ray has an immediate and continuous effect of relief from pain and circumscription and retrogression of the disease."

Here followed a reference to several cases under treatment without detailed report. A sarcomatous tumor in the abdomen, referred by Dr. Leonard Weber, had shrunk to half the size. Another similar case had so far improved as to allow the patient to attend business. Two epitheliomas within the fauces show arresting of the disease.

The same improvement is shown in another class of interior cases, namely, carcinoma of the breast. A recurrent tumor has been cured; three others not yet reported seem cured. In a number of others all are of long standing and their reaction to the treatment varies; in general, ulcerations heal, nodules scatter, hardened and reddened areas become soft and disappear, indurated glands are no longer found. In one case there is only slight improvement, the tumor being somewhat smaller and more moveable.

"I am, furthermore, treating a patient with appendicitis, who was suffering daily pain and advised to submit to an immediate operation, but who has presented no further symptoms of the disease from the first week of treatment, except one mild attack.

"As a further instance of interior effect, I have treated and cured two patients with melancholia by x-raying the brain, and relieved a tic douloureux, which has undergone two operations to remove the nerves, by x-raying the casserian ganglion.

"There is therefore no question in my mind but that the x-ray should be employed in interior and in internal cancer and other diseases internally located.

"3. Operable Cases.—In so-called operable cases of cancer, particularly those of carcinoma of the breast, the propriety of employing the x-ray will, no doubt, be long a debatable ground. For my own part, I now believe that no case should be operated upon until it has first been treated by the x-ray, and for these reasons:

"(*a*) The earlier a case can be treated the more

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rapidly it yields to the influence of the x-ray.

"(*b*) The infective process (distribution and growth of the cancer particles) often ceases under x-ray treatment; the proof of this assertion lies in the fact that this process, even when fully developed, may be arrested by the x-ray, and visible carcinomatous nodules and kernels disappear, while no new ones occur.

"(*c*) Circumscription of the area of invading disease, retrogression of the growth, and relief from suffering can be confidently predicted.

"(*d*) So long as a malignant growth continues to improve under x-ray treatment no operation is necessary.

"(*e*) Of the two, the x-ray and an operation, the former appeals to the patient as an infinitely preferable procedure, and should it fail no valuable time has been lost.

"(*f*) A sufficient number of carcinomas of the breast, of sarcomas, and of epitheliomas cured, have already been reported, to justify a claim that the percentage of permanent recoveries may compare favorably with the results attained by a surgical operation."

The doctor here gives statistics to prove this. He then advocates using the rays before and after operation. The rays in one case clearly circumscribed the disease, because after a few treatments (a rapidly advancing epithelioma of the upper jaw in which the entire mucous membrane of the roof of the mouth was reddened), a clean-cut line of demarcation appeared just to one side of the median line, presenting a characteristic serpentine edge. The outline would have been of great value to the surgeon. After an operation the x-ray can search out all foci and areas of inflection unreached by the knife.

"Finally under conditions of administration the x-ray builds up tissue. The following case is instructive: I treated a young woman for an enlarged gland and gland inclusion in the right axilla. At the end of six weeks the lymphatics were comfortable, but the patient remarked, and it was plain to see, that the neck, chest, shoulder and breast on that side had remarkably developed, and that the skin on that side was firm and glossy. The patient now desires to receive treatment in the left axilla to even up matters.

"In treating the brain in the two cases of melancholia, previously referred to, the hair became glossy and abundant where it had been previously dry and scant.

"In fact, the question may be reasonably asked whether the general therapeutic effects of x-radiation are not due to a capacity for establishing favorable tissue metamorphosis, rather than to a capacity for destroying or modifying bacteria or other micro-organisms.

"Conclusions.—1. Radiotherapy broadens our conceptions of the possibilities of the therapeutics of modern medical science.

"2. The x-ray has a general application for the relief of pain.

"3. As to technique, a standardization as to apparatus and its capacity, and as to duration and frequency of treatments and distance of the tube, is recommended to operators.

"4. The x-ray has a curative effect in internal cancer and other internal diseases.

"5. For superficial diseases a medium soft tube may be used, for internal cases a hard tube. The hard tube is applicable, however, in all cases.

"6. X-radiation is recommended prior to any operation, to clear the tissue of cancer particles and foci, and to circumscribe the disease.

"7. X-radiation is recommended after operation to preclude a recurrence.

"8. X-radiation may be recommended in place of an operation, and may be preferable to one for the reason that operation secures but a comparatively moderate percentage of permanent recoveries, and because up to date the x-ray procedure shows a continued improvement in cases, and a percentage of cures which will, undoubtedly, compare favorably with surgical operations.

"9. There is danger to the patient or uncertainty as to what might be accomplished when the x-ray is employed by immature operators.

"10. In x-radiation we possess more nearly a solution of the problem of curing cancer than by any other method of treatment."

THE CURE OF CANCER BY THE X-RAY.

A discussion on the above subject occurred in a meeting of the Medical Society of New Jersey, held on July 24-26, and reported in the New York Medical Record of Aug. 2. Dr. Benjamin of Camden read a paper acknowledging the cure of some twenty cases, and reasoning that the power of the rays to penetrate wood 6 inches thick and burn the human body without burning the wood proved it an agent powerful enough to influence cancer, even if deeply seated. Dr. Chambers of Jersey City, while acknowledging the limitation of his personal experience, had been informed by Dr. J. E. Stubbert "that it was possible to pass the x-ray through a speculum and then bend the ray to focus it on a particular part. This should prove a valuable addition to the technique."

Comments.—Now and then Radiotherapists have to cry "protect us from our friends." We hope that the short report did utter injustice to the paper since the reasoning concerning the burning power of the rays is astray. "Burning the human body without burning the wood" is a true phenomenon, but the statement is misleading unless explained. An intense radiation of heat waves from a fire would burn any wood screen

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placed near by or they would produce a burn on the unscreened body. But the x-rays do not act on the tissues or anything absorbing them as do heat waves. The latter raise the temperature of a substance absorbing the heat waves, but the x-rays are not heating at all. A heat burn develops very soon after exposure to heat waves, while an x-ray burn may be latent for several weeks after the exposure to the rays. The inflammatory process set up is not due to high temperature but to an effect on the nerves by which the inflammatory process is set up.

We must also take exception to the statement that "the rays may pass through a speculum and then be bent to a focus on a particular part." This statement is altogether incorrect. The rays cannot be bent by reflection or refraction. They diverge from that part of the anode which is being bombarded by the cathode rays. Neither can the rays be brought to a focus in the true sense of the word. When a beam of light has been brought to a focus by a lens we mean that the light has been made to converge upon a small area. The x-rays, as said above, are divergent, and cannot be made to change their direction. In passing the rays through a speculum care must be taken that the axis of the speculum shall be in the same line as the direction taken by the most powerful part of the radiation sent out by the tube. This radiation is at an angle of 90 degrees with the axis of the tube or at an angle of 45 degrees with the anode. The patient is therefore placed in such a position that the aperture of the speculum will allow the free passage of the rays through it to the tissues which are to be treated. This should hardly be called focussing the rays, but might better be called the correct aligning of the speculum since the rays themselves are not changed in any way.

We imagine that the focussing referred to was obtained with a new kind of tube having the target, not in the bulb, but in an end piece. This tube is described elsewhere in the Journal.

THE EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS WITH THE X-RAY.

The importance of the early diagnosis of pulmonary tuberculosis is admitted by all physicians and the aid of a new diagnostic agent has been cordially welcomed. In the American Congress of Tuberculosis that was held in New York June 3-5, a paper with the above title was read by Mihran K. Kassabian, M. D., delegate from the State of Pennsylvania. Dr. Kassabian kindly furnished us a reprint of his article from which we are permitted to make the following abstract:

The physical signs in the incipient stages of pulmonary tuberculosis may be readily overlooked and only the greatest care will reveal the lesion. Among these are the following: (1) Defective expansion as demonstrated by inspection and palpation; (2) enfeeblement of the normal vesicular murmur with prolongation and elevation of the pitch of expiration; (3) characteristic clicking rales.

Any one or more of the following symptoms may be present: Dry hacking cough, dyspepsia, loss of appetite, anaemia, hemorrhage from the throat or lungs, rise of temperature in afternoon or evening, quickened pulse. Personal and family history are important as a means of diagnosis. Microscopic examination of the sputum is of value but is sometimes negative. The tuberculin test is losing favor.

The Roentgen rays furnish us with accurate and definite information of the condition of the lung tissue. Only the practiced operator is competent, however, to interpret the evidence of the rays.

TECHNIQUE.

The clothing is removed from the entire chest and one lung is compared with the other as seen in the fluoroscope. The normal lung is transparent while a diseased spot shows a spot of haziness or clouding. The diaphragm is impaired in its movements on the affected side. The lung should be viewed at the end of the deepest expiration and inspiration possible.

The skiagraph furnishes the most detailed information and requires an exposure of only a few seconds. Three cases were given to illustrate the value of the skiagraph. One, a female cigarmaker, age 28 years, with expectoration of blood and impaired percussion-note and high-pitch expiration at the right apex. Microscopic examination gave a negative result. The skiagraph showed abnormal haziness at the apices of both lungs, more marked at the right. Case 2, a cigarmaker, with all the physical signs negative; slight expectoration of blood. X-ray picture showed commencing consolidation over circumscribed areas on both sides just below the apices. Case 3, boy 14 years old; had been in delicate health. Symptoms: Malaise, headache, slight cough in evenings and mornings; slight abdominal pains. Evening temperature on admission was 100 degrees F. Physical examination showed a phthisical thorax. Tuberculin injection gave a positive reaction. X-ray examination showed a slight haziness below the left clavicle.

A CASE OF DOUBLE RACHITIC COXA VARA.

Gevaert (Journal de Chirurgie et Annales de la Societe belge de Chirurgie, No. 1, 1902.)—The patient was a boy of eight years, in a moderately good state of nutrition. The most pronounced symptom was in the limitation of abduction, this being true of both sides. Flexion of both sides was normal, inward rotation somewhat limited on both. There was no other external mark of rachitis on the speletal system. The child could walk or play with no more fatigue than others of the same age; there were none of the usual sensitive or painful areas. The diagnosis of coxa vara was verified by the x-ray examination.

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NOTICE.

The September meeting of the Chicago Electro-Medical Society will be held in Room 912 at the Masonic Temple, corner State and Randolph, Tuesday evening, September 30th, at 8 o'clock p. m. Prof. C. H. Treadwell will read a paper on "Results in various methods of treating cancers with the x-ray." Other important business will come before the society.

Everybody is invited, YOU ESPECIALLY.

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VALUE OF ROENTGEN RAYS IN TREATMENT OF CARCINOMA,

Abstract of an article by Carl Beck, M. D., in Medical Review of Reviews.

The author holds that all integumental forms of carcinoma are accessible to Roentgen-therapy, also the tongue and the cervex uteri at an early stage. He prefers extensive removal because more quick and effective, with after treatment of irradiation, since carcinoma cells cannot be reached with the knife.

Regarding the cause of recurrence he writes the following:

"We must consider that in the majority of cases the recurrence of carcinoma is caused by the epithelial cells of the primarily affected area, and but rarely by those of the secondary foci. Local recurrence, the most frequent form, is always produced by the carcinomatous cells which were left back at the operation, while the indirect type originates from neighboring tissue, which at the time of the operation appeared to be normal, but in fact carried the embryonic elements of carcinomatous infection.

"A carcinomatous portion, however, left at the time of operation must not necessarily always be the cause of further infection. The vis medicatrix naturae often attempts to secure a natural protection by surrounding the cancer alveoli with giant cells, which, as microscopical examination shows, starts a regressive metamorphosis analogous to the well-known healing processes in tuberculosis. It is the abundance of the epithelial toxines which prepares the soil for the new invasion and further development of the carcinoma cells. This also explains the rare occurrence of blood-metastasis in carcinoma. If these cells could not really be destroyed, but if only a regressive metamorphosis was induced by the rays, a great advance in the treatment of this horrible disease would be made. So far I have treated ten cases of recurrent carcinoma of the breast after the operation. In all of them a decided improvement could be observed. One case of adeno-carcinoma, recurring three months after most extensive removal by an excellent surgeon, was reported by me at the meeting of the New York State Medical Society, Jan. 29. Within another three months a large infiltrated mass, reaching from the sternum to the axilla had formed. The supraclavicular region, the shoulder and the whole upper extremity of that side were oedematous to the utmost degree. Near the sternum a small ulcerating area was noticed. The patient suffered temporary pain of great intensity. I did not believe then that there was any possible chance even of improvement, but the husband urged me to try irradiation nevertheless. The whole area was exposed, first at intervals and then every day, for an average of twenty minutes. There were sixteen exposures altogether before the report. After the fourteenth exposure the infiltrated area began to shrink

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and the oedema disappeared entirely. The recurring growth had reached the pleura, as was evident from the presence of pleuritic effusion which was aspirated. A specimen taken from the irradiated area showed colloid degeneration, the adenoid character having disappeared. This seems to some extent to show the mode of cell-metamorphosis which the cells undergo after irradiation. The microscopical examination made by Dr. H. Kreuder revealed the following condition: Adenocarcinoma with beginning colloid degeneration. The tumor shows a resemblance to glandular structure, in most parts the alveoli are completely filled with epithelial cells, so that in some places they appear like alveolar carcinoma. Some areas have undergone degeneration, their epithelial cells not taking on the stain the same as the others. The cells have diminished in size and the degenerated area, except the nuclei, appears coarsely granular. Changes of the same nature are observed in the epithelium of the skin covering the tumor (also due to the action of the rays). In some parts of the necrotic area a large amount of dense connective tissue and marked vascularity are noticed.

"The patient was at the time of the report free from pain and her appetite had increased. A few days later the superficial layers around the ulcerating area shed themselves as scabs.

"Even in this desperate case the temporary influence of the rays was well marked. The patient after a long period of euphoria succumbed to pleuropneumonia two months after the report."

Technique.—"In such cases hard tubes must be chosen, while in neoplasms confined to the skin soft tubes are preferable. My observation suggests that irradiation should be begun as soon as union is perfect after the removal of the neoplasm, and should be kept up for a period of several weeks.

"The soft tube is the tube par excellence in the Roentgen-therapy of integumental and subintegumental growths. Deep-seated or visceral tumors, like carcinoma of the stomach, for instance, are also reached by the rays, provided hard (deep-penetrating) tubes are chosen. But their influence is too weak then to warrant cell-metamorphosis. In thin animals, like mice (compare former publications on this subject—viz., Medical Record, Jan. 18, 1902, and textbook on "Die Roentgenstrahlen im Dienste der Chirurgie," Seitz und Schauer in Muenchen, 1902), rays of great intensity showed marked reaction at the opposite side of the body (abdomen, for instance, when the dorsum was exposed). The signs of reaction at the opposite side appeared a week later, on an average, than those of the area directly exposed. In men visible effects at the opposite side have not been observed.

"As to the technique of Roentgen-therapy, it is advisable to expose for five minutes at first, and after a week for about ten minutes. If, after a third exposure, two weeks after the first exposure, no reaction has been shown, the patient apparently is not liable to have an idiosyncrasy. Then he may be irradiated every second or third day, and at last daily until intense reaction shows itself.

"During the tentative exposures the distance of the tube should be four inches, later on it may be one inch only. Some patients like the direct contact with the tube, and I have seen no harm from it in resistant individuals.

"If a large area is to be irradiated the distance of the tube must be greater than if small foci only are to be exposed. Tumors of globular shape must be irradiated from different sides so that all surfaces may be equally well reached.

"In benign integumental diseases a shield of lead must be fastened over the area to be irradiated. It may be attached to a bandage. To the uneven surface of the margin tinfoil or a piece of cork may be added. Corresponding with the area to be irradiated a hole is cut in the shield. In the treatment of malignant growths, however, the use of a shield is improper, since it is intended to have the influence of the rays extend as far as possible. During the intervals xeroform-salve (1 to 10 lanolin) should be employed."

Reports of Cases.—Carcinoma of the left breast, involving in addition the axillary glands. Age of patient, 57; first examined in February, 1894. Extensive operation, removing not only the pectoralis major muscle and axillary glands, but also a large area of adjacent integument requiring a plastic operation to fill in the gap. Recovery perfect; recurrence in six months, a small nodule on the anterior axillary fold. Thorough excision. A period of euphoria for a whole year. In September, 1896, hard nodule removed near the sternum. In June, 1897, a small nodule near the axillary removed. In October, 1898, recurrence of the posterior axillary line. Extirpated April 11, 1899. Recurrence treated with icthol-vasogen. On Jan. 16, 1900, tumor 8x9 cm. in diameter. Dissection of axillary artery and ligation of the axillary vein. Microscopical examination: Carcinoma with fibrous tissue. Feb. 19, 1901, removal of a tumor the size of an egg. Aug. 21, removal of another tumor, starting from the stump of the pectoralis major. Oct. 31, 1901, operation in the pectoral region and removal of two nodules in the axillary region. Jan. 13, 1902, recurrence of tumor size of filbert in the axilla, also one tumor size of a walnut below the clavicle; third in left arm in former region of pectoralis major muscle and alongside the biceps muscle. None of tumors movable; medication, thyroid extract. Because of extent of growths and the oedena of the arm Roentgen-therapy was considered.

Operation was first made removing the entire biceps muscle and part of the tissues in the axillary region. The infraclavicular tumor could not be entirely re-

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moved. "After ten irradiations of thirty minutes each the general condition of the patient has improved remarkably. There is an infiltration below the clavicle and also along the triceps muscle, but no more oedema.

The Author's Comments.

"I regard this case in spite of its imperfect recovery a triumph of surgery. Nearly nine and a half years have now elapsed since the first sign of carcinoma were observed, and nearly eight years since the first operation, which was performed under the most unfavorable circumstances, due to the patient's own procrastination. The patient still appears well. I expect no recovery, but believe that under the Roentgen treatment her condition will improve still further."

Case II.—Unmarried woman aged 47 years. Noticed small nodule on left breast January, 1896. Delayed treatment until Dec. 21, 1897, when she submitted to extensive operation. Recurrence in August, 1898, near the sernum. Second operation November, 1898. Recurrence in March, 1900. Treatment was local—antiseptics and administration of Fowler's solution. Irradiation began in March. Large, hard mass covering the manubrium sterni and a large ulcerated area in the left mammary region. Considerable oedema present.

Treatments.—Twenty-four irradiations each of thirty minutes in length. Result, large mass above the sternum shrank almost entirely; many of the ulcerations cicatrized.

Third Case.—Married lady aged 42. Left breast amputated three months ago. Speedy recurrence in the cicatrix and also a metastatic tumor in the supraclavicular region. Patient suffered from intense pain, not relieved by large doses of morphine.

Author's Comments.—"After two treatments of five minutes' exposure, the pain ceased and the patient was able for the first time to enjoy a night's rest. This anaesthetizing influence of the rays is most wonderful in some cases."

AN APPARATUS FOR LOCALIZING THE X-RAY TO THE CAVITIES OF THE BODY.

Abstract of an article by Margaret A. Cleaves, M. D., in the September issue of the Journal of the Advanced Therapeutics.

The paper mentions the difficulties of treating internal growths in the chest or abdomen. The writer has used the apparatus for the treatment of the larynx, tongue, rectum, prostate, cervix uteri, vagina. As shown in the cuts, the target from which issues the X-rays is placed not in the center of the tube, but at the end of a tubular prolongation extending nearly to the center of the spherical part. In Fig. 1 the anode is at "A," the target "t" is not connected with the coils. In Fig. 2 the target "t" may be made the anode. In this case it is necessary to use a tubular hood of sheet metal attached to a metal handle. The positive wire from the coil is attached to a post in the handle and contact is made with the target "t" by the metal hood. With either tube the positive terminal of the exciting machine is grounded. The projection carrying the target may be inserted into the vagina or rectum through any of the common forms of rectal or vaginal specula. Thus the rays may be directly applied to the vagina, cervix uteri, rectum, also to the prostate, through the rectal walls. It could also be inserted through an artificial sinus in the abdominal wall in advanced malignant growths of the viscera. The writer somewhat favors the first tube, as there is some danger of the contact piece of the second tube

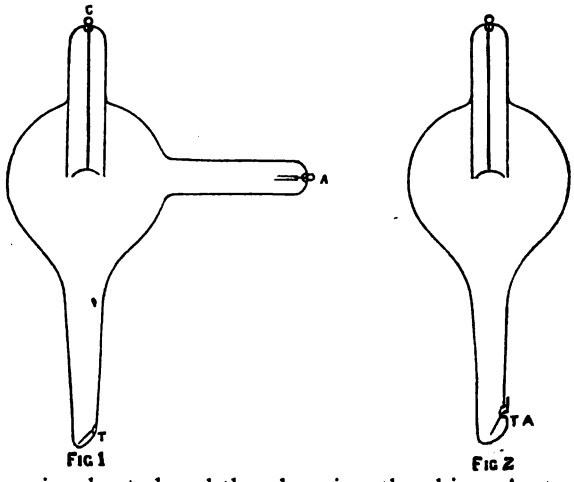


FIG 1 FIG 2

becoming heated and thus burning the skin. A strong exciting current is not required, since the source of the rays is so close to the parts to be treated. The time of exposure can also be short. A static machine would give less heating effect than a coil. The tube was devised by E. W. Caldwell, B. S., and first described in the New York Medical Journal of July 12, 1902.

THE RADIOGRAPH AS AN AID TO THE DIAGNOSIS OF CALCULUS IN THE URETER.

Hugh M. Young, M. D., in the American Medicine of Aug. 9 contributed an article on the treatment of calculus of the lower end of the ureter in the male. We give in full the history of the two cases in which the X-ray aided in the diagnosis:

Case III.—Calculus impacted in the right ureter about 2 cm. above its lower orifice. Demonstration by catheter cystoscope and X-ray photograph. Complete disappearance after water cure.

The patient, a male, 34 years of age, had his first attack of colic in the region of the right kidney five days before his entrance into the Johns Hopkins Hospital, on July 4, 1901. This attack was characterized by severe pain, which radiated down into the testicles on the right side. The urine contained a great deal of blood, but micturition was apparently normal in frequency, though small in amount. Two days after the beginning of the attack patient had a severe chill and fever; his pain was so great that he required

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large doses of morphia. On admission to the hospital he was still suffering with slight pain in the right side, but on the second day this had disappeared. Examination then showed a palpable right kidney which was distinctly tender on pressure; no pain in the course of the ureter, nor on rectal examination.

July 12 two X-ray photographs were taken, and each showed a small shadow in a location corresponding to the lower end of the right ureter. The shadow was much smaller than in Case I, but in about the same position. The diagnosis of probable ureteral calculus was made.

On July 13 I performed a cystoscopic examination, which showed the bladder to be perfectly healthy and ureteral orifices normal. The left ureter was easily catheterized, but on the right side the catheter passed only for a short distance, about 2 cm., when it met a definite obstruction. After several attempts and considerable pressure, it finally passed by this obstruction, and was then easily pushed up to the right kidney. Examination of the urine showed nothing definite. The diagnosis of obstruction in the right ureter, just above the bladder, probably due to a calculus, as shown by the radiograph, was made. An effort was made to dilate the lower end of the ureter by means of Albarran's catheters. For this purpose his bougie was first passed into the right ureter and the cystoscope was then withdrawn and a catheter passed upon the bougie, which was used to guide it into the right ureter. The catheter refused to pass up the ureter, however, probably becoming caught in the orifice, and after several attempts the bougie was removed. The patient suffered only moderate pain during these proceedings, had no return of colic after them and was discharged, apparently in good condition, nine days later. He was instructed to take urotropin three times daily and to drink as much water as he could, if possible one gallon daily, with the hope of washing out the calculus.

On Aug. 9 the patient reported to me that he had had a severe attack of colic one week after leaving hospital, again on the right side, and again radiating to the testicle, but since then he has been free from pain and feels well. The urine was clear and contained no blood. The patient was advised to continue use of urotropin, to take a holiday and to drink large amounts of water.

He went to a sanatorium in New York where he remained for six weeks and was greatly improved in general health and strength.

On October 4 the patient had another severe attack of colic, passed no blood, and after several hours the attack wore off and the patient has had none since. A radiograph taken on October 11 showed no calculus, but was not a satisfactory plate.

Examination March 5, 1902.—Patient says he has been free from attacks since last October; he has not, to his knowledge passed any calculus, and has felt perfectly well. He has drunk a considerable amount of water, but not so much as during the summer. He feels in perfect health. Examination of the abdomen was negative, there was no tenderness in the region of either kidney or ureter, and the rectal examination showed nothing abnormal above the prostate. On bimanual examination a splendid examination was obtained for a considerable distance above the prostate, but nothing was felt in the region of either ureter. The urine is clear and microscopially negative. A cystoscopic examination was made and showed the bladder to be perfectly healthy. The ureteral orifices were normal and of equal size. The ureter catheter passes easily into both ureters well up toward the kidney. There is no obstruction met in the right ureter and no grating sensation felt. The urines obtained from the two kidneys are of about the same quality. It seems evident from the history and the cystoscopic examination that the calculus has been passed. The fact that it was not detected is of no consequence, since we know that in case II a calculus of considerable size passed without the patient's knowledge.

Case IV.—Removal of three large calculi from the lower end of the left ureter through an extraperitoneal (iliac) incision. Recovery.

I am indebted to Dr. Finney for the privilege of reporting this case. The patient, a man, aged 33 years, had been subject to attacks of kidney colic for ten years. When admitted to the hospital July 12, 1901, he was in fairly good condition; heart and lungs were normal. Examination of abdomen negative. The abdominal muscles were held so tense that it was impossible to palpate the kidney or ureter successfully. On rectal examination nothing was felt in the pelvis. The bladder was searched for stone with negative results. The urine was extremely cloudy and contained pus and bacteria. An X-ray photograph showed a large oblong shadow in the pelvis in the course of the left ureter. The upper end was near the posterior wall of the pelvis and the anterior end was at a point near the bladder. Cystoscopic examination was not performed. Operation was performed July 23, 1901, the kidney first being explored by oblique lumbar incision. The kidney was in fairly good condition, but the ureter was greatly dilated, and on following it down into the pelvis a large calculous mass was felt. In order to remove this a second incision was made in the iliac region and the ureter exposed extraperitoneally. After considerable difficulty three large stones were extracted and the ureter closed. The patient had an uninterrupted convalescence and there was no leakage from the ureter. Six months after the operation he reported that he was well.

At the close of the article he gives the means of detecting the presence of calculi in the ureters from which we make abstracts:

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"Diagnosis.—There seem to be few, if any, symptoms of decided value in determining what position a stone occupies in the ureter, whether high up or low down. In both you may or may not get the classical symptoms of renal calculus. In one of my cases in which the stone was caught in the orifice of the ureter the patient suffered severely with vesicle irritation and pain running down to the end of the penis, associated with frequent micturition."

"Physical examination is often of little help. When the stone is below the brim of the pelvis the characteristic tender point on abdominal palpation, which often indicates the point of impaction of calculi higher up the ureter, is absent. Rectal examination will, however, often show the location of calculus."

The author says the cystoscope of Nitze is of great value, as also the catheterizing cystoscope. By the former any abdominal condition of the walls of the bladder near the ureteral orifices can be detected and the presence of stone in the lower ureter diagnosed. By the latter a calculus may be detected when in the ureter by the stopping of the catheter at the point of the stone's location.

The condition of the opposite kidney is of greater diagnostic value since in nearly all cases it becomes hypertrophied. The value of each kidney may be ascertained by the determination of the urea, the freezing points of the two separate urines and the relative elimination of sugar by the kidneys after the hypodermic injection of phloridzin.

"Of very great value also is the X-ray, and the medical profession owes a very great debt to Philadelphia for the splendid service which has been rendered by C. L. Leonard in proving that ureteral calculi can be detected by the radiograph. It has been of very great assistance in my cases, and no examination can be complete without it.

"There are, of course, slight chances of error. For instance, a phlebolith of the lateral veins of the pelvis or in the region of the seminal vesicles, where they are so commonly seen, might be mistaken for ureteral calculi, especially in those cases of chronic prostatitis associated with slight hematuria. I have seen one such case, but the cystoscope showed that we had no ureteral trouble.

"But a good radiograph should always be obtained, though we should not in our zeal take too many, as I have seen several very disagreeable burns result therefrom. With careful history, vigorous repeated bimanual rectal examinations, the radiograph and the cystoscope the diagnosis of calculus, its location and the relative condition of the kidneys is easy and certain, and we are now in position to decide upon therapeusis.

"The therapeutic indications are so manifold and I have already consumed so much time that I can only give a mere outline of the results of this study of the question. The treatment indicated depends on a multitude of things; the age, history and duration of the disease, the frequency and character of the attacks, the condition of the patient and, above all, the question of what the effect on the kidneys has been. The frequency with which calculi are passed one or more times, with no subsequent recurrence, is sufficient to prove the value of a waiting policy. One of the cases which I have detailed has almost certainly passed a small calculus which was located at the vesical junction of the ureter (III).

"Leonard's recent article in American Medicine (November 30, 1901) covers the subject pretty well. Leonard shows that small calculi may remain impacted for life on the ureter without producing symptoms or interfering with the function of the kidneys. They may, however, remain quiescent but destroy the kidney, which, after fruitless attacks of colic, may finally cease to secrete and gradually atrophy, without producing any further symptoms, the other kidney assuming the entire work. If now the second kidney become blocked by a stone, the chances of fatal anuria and death after operation are great. This is beautifully shown in the photograph (Fig. 7) of one of my specimens. The left ureter is blocked by two stones, the kidney above much atrophied, and the other kidney greatly hypertrophied. These facts should lead, as Leonard suggests, to frequent X-ray examinations to determine what is going on, and I should add, to an accurate determination of what was happening to the kidney, by ureter catheterization. If the kidney were not functionating operation should be performed to remove the calculus, regardless of symptoms. When the attack is severe suppression of urine or sepsis has set in, operation should, of course, be immediate."

Comments.—To an X-ray operator the above article is a warm recognition of the diagnostic value of the agent he employs. He is often called upon to make diagnoses in such obscure cases and he should therefore be familiar with all the symptoms of diagnostic value.

DISCUSSION ON X-RAYS IN THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

The meeting of the association was held in Boston May 26 to 28. Dr. Bryson Delevan of New York gave a paper on the X-ray in the treatment of malignant diseases of the larynx. He advocated the use of the X-rays in cases of slow progress, though he did not know of a reported cure of carcinoma of the larynx.

Dr. H. Y. Swain of New Haven stated that the progress of the disease had been checked in three inaccessible growths.

Dr. W. E. Casselbury of Chicago reported on one of Dr. Pusey's cases, a deeply seated carcinoma of the larynx. The treatment had been discontinued after

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four weeks' treatment without apparent improvement. In the next four weeks improvement was rapid, though no treatments were given. He felt two weeks was too short a time to test the effect of the rays.

Dr. J. Payson Clark of Boston reported a case of carcinomatous infiltration of one side of the larynx and a well-marked cancerous cachexia. Pain was relieved after three treatments, but the patient was too feeble to return for treatment.—Abstract from the New York Medical Journal.

DISCUSSION OF THE INFLUENCE OF ROENTGEN RAY UPON THE DIFFERENT VARIETIES OF SARCOMA.

The above discussion occurred at the meeting of the American Surgical Association, held at Albany, N. Y., June 3, 4 and 5. Dr. Wm. B. Coley of New York reported ten cases of sarcoma treated recently, all showing marked improvement. Some improved under a conjoint treatment of the toxines and the ray. He held that the ray, if not a curative agent, is at least one of great inhibitive power.

Dr. Richardson of Boston had referred a number of cases to Dr. Coley. He concurred in the value of the treatment.

Dr. Gerster of New York said he had seen no cures. The old German surgeons got as good results. The reported cures were possibly cases of syphilitic deposits.

Dr. Coley in closing said these cases had been diagnosed by the best pathologists in the country.—Abstract from the Medical Record of July 5, 1902.

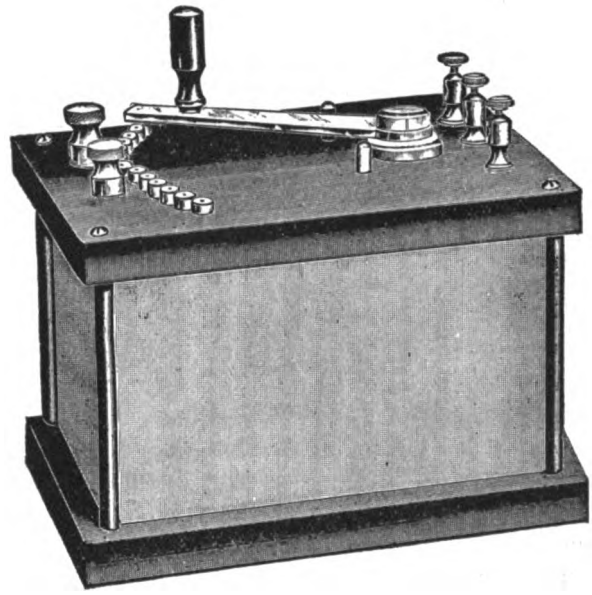
Comment.—The adoption of the X-ray by Dr. Coley will be viewed with satisfaction by radio-therapeutists. Our readers will remember an article in the June issue of our journal in which we described the toxine treatment of sarcoma used by Dr. Coley. In that article we suggested that the X-ray could be conjointly used with the toxines. It appears that Dr. Coley was at that time using the two agents on the cases he reported.

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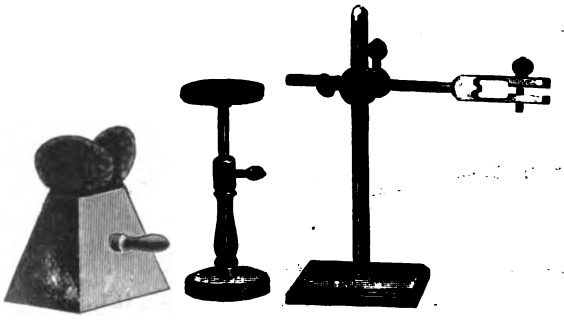
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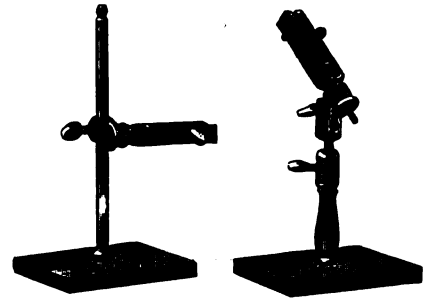
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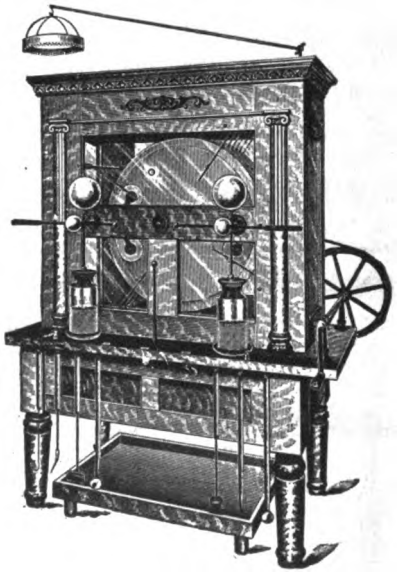
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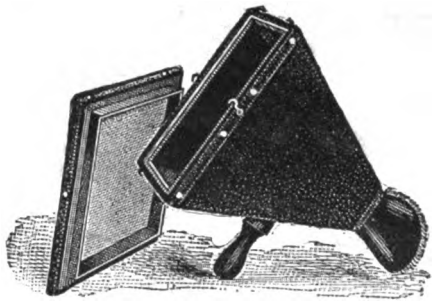
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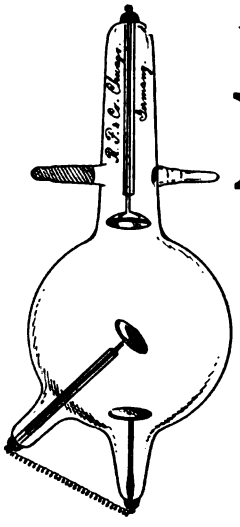
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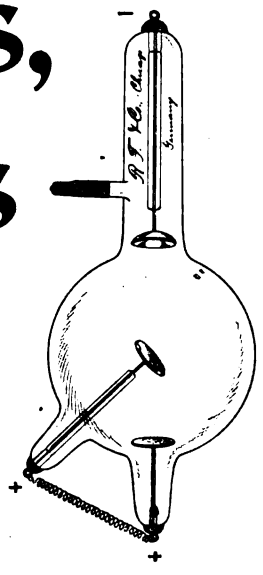
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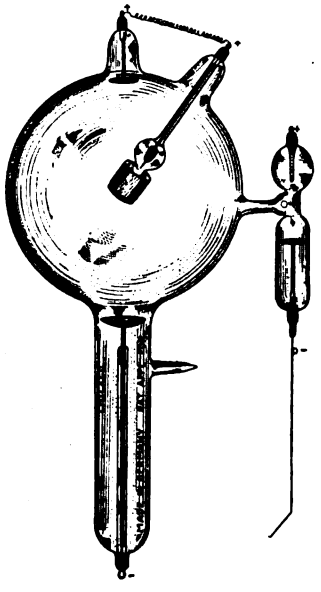


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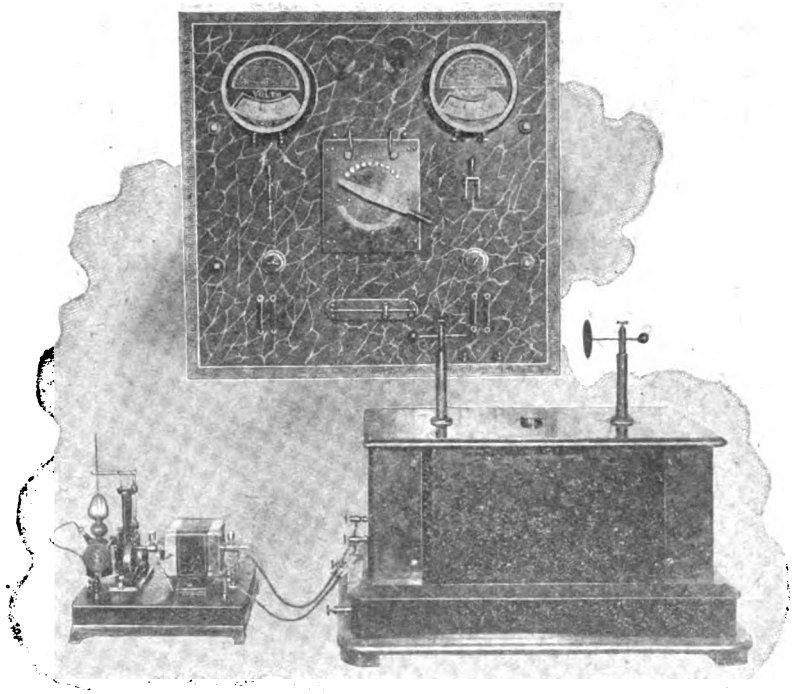
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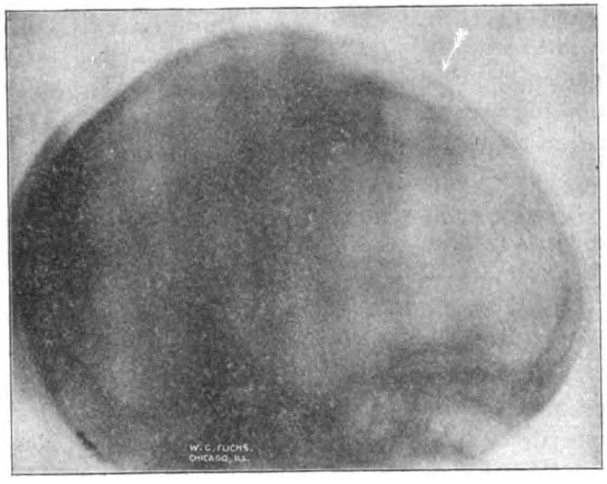
ORIGINAL CONTRIBUTIONS.

BRAIN TUMOR LOCALIZED BY X-RAY.

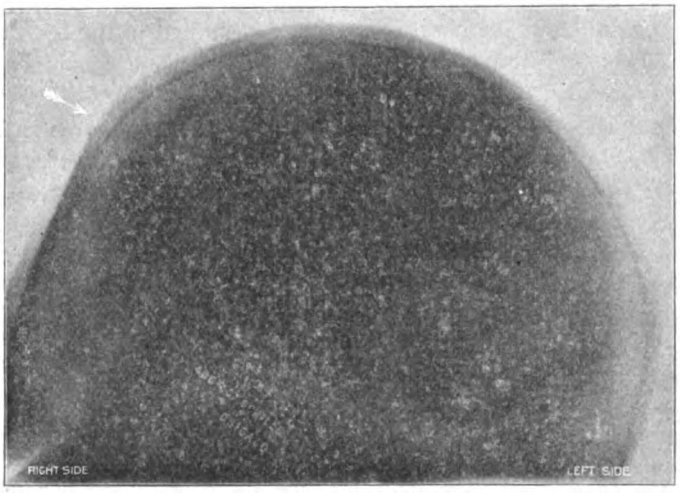
By W. C. Fuchs, Schiller Building.

The following case was sent to me for skiagraph by Carl Beck, M. D., of Chicago, who has kindly furnished a general history of the case:

Case.—H. H., little girl 3 years old brought to the doctor with paresis of half the body, comprising the face, arm and leg—almost totally blind. She had been examined by different oculists, who had pronounced it a case of papillitis choked disc, most likely produced by tumor of the brain. Examination showed all the symptoms characteristic for tumor of the brain in the subcortical motor area. The X-ray picture showed by its shadow a tumor of the size of a hen's egg. The nature of the tumor was in all probability a cyst, because the history pointed to the fact that the patient had sustained a subcranial hemorrhage from a fall about one year previous to that time.



Lateral View.



ntero Posterior iew.

The operation proved all the suppositions to be correct. A plastic opening of the skull was made and a

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flap of the dura formed. The brain was incised and a cyst of the size indicated by the skiagraph was removed. The child had an uneventful recovery. Her paresis disappeared entirely, so that she could use both arms and legs. She has also recovered some of her eyesight, being able to distinguish large objects and some colors if they are not very saturated.

TECHNIQUE OF THE SKIAGRAPH.

I used a coil with wehnelt interrupter. Tube a little above medium; distance between tube and plate twelve inches. Time of exposure one minute and a half. The Carbutt X-ray plate was used. The developer was metol-hydrochinon. I carried through the plate to the correct point without reference to the appearance of any shadow in the skull during development. It is, of course, necessary to know when this point has been reached, but if the correct X-ray has not been used no amount of manipulation of the plate during the development will produce any details which have not been previously made by the rays. The tube is therefore of fundamental importance. The correct quality of the rays and the required intensity of the radiation will produce the desired result.

A STUDY OF THE RESULTS OF VARIOUS METHODS USED IN THE X-RAY TREATMENT OF CANCER.

Paper read at the meeting of the Chicago Electro-Medical Society, Sept. 30, 1902, by Prof. C. H. Treadwell.

This paper does not claim to be a complete review of the field. It is limited to prominent articles that have appeared in the medical journals of this country and England. Many small articles have appeared in which the work is of high order. As far as possible these reports have been included in the paper. Several reports have been excluded because the technique employed was not definitely described, an exception being made to the articles in the British medical journals. I have also omitted reports from members of this society because these reports and the technique used will be brought out in the discussion. As the title indicates, the discussion is limited to the treatment of the various kinds of cancer.

Without doubt there was at first no carefully prepared plan in the treatment, the operators simply feeling their way. The treatment was discontinued at the first sign of dermatitis to avoid severe burns. Very little attention was paid to the vacuum of the tube. Each operator used whatever tube he had. The kind of generator and the degree of excitation of the tube were not considered important. For this reason the early reports have little value in the present discussion. The history of cases and the microscopical confirmation of the diagnoses were given, but the technique of the X-ray treatment was omitted.

We shall first consider the results obtained in the treatment of the various kinds of epithelioma. According to Charles Warrenne Allen of New York, there are recognized three clinical forms of skin cancer now designated epithelioma, although the fact is recognized that all carcinoma is of epithelial structure. The first type is rodent ulcer appearing as a rather rounded ulcer on some part of the face, the ulcer tending to crust over, presenting a raised, ringed border of pearly tissue, which breaks down readily under mechanical pressure or the currette; later on in its history it goes on to deep and widespread destruction of tissue. Second is the epithelioma proper or carcinoma of the rete Malpighii as typified in cancer of the lip. Third, epithelioma springing from the sebaceous gland structure. This form is considered rare.

One of the earliest reports giving a detailed account of the technique employed was that of Johnson and Merrill in the Philadelphia Medical Journal of December, 1900. A subsequent report was given in the American Medicine and an abstract made in the "Era" of August, 1902. In the first article they reported six cases. At the close of the article they described their full technique: large coil; used soft tube in order to set up a dermatitis. They first determined the burning time of the tube, "for of two equally soft tubes operated on the same current one may produce a burn in three minutes, the other in thirty minutes." They exposed the area evidently diseased, also the surrounding tissue for a little distance. "It is our object to produce a mild inflammation and pigmentation in and about the diseased tissue, gradually increasing its severity until we have a burn of such depth that it will require six weeks to heal on the normal skin." Treatment suspended for a month, and if cure is not complete the process may be repeated.

In the abstract in the Era it was shown that of sixteen epitheliomas of the face (of which three were rodent ulcers) ten patients were cured; four showed improvement, of which three give promise of ultimate recovery, and two cases were failures. The results obtained in the ten cases cured were most satisfactory when one considers the few exposures of the various cases. The following table shows these facts:

Case 1. 5 exposures in 34 days.
Case 5. 5 exposures in 16 days.
Case 6. 4 exposures in 10 days.
Case 7. 5 exposures in 2 months.
Case 14. 20 exposures in 18 months.
Case 15. 3 exposures in 4 days.
Case 17. 7 exposures in 12 days.
Case 22. 2 exposures in 4 days.
Case 25. 3 exposures in 18 days.
Case 27. 5 exposures in 16 days.

Williams in his book reported five cases of epidermoid cancers. Tube used, 1.5 cm. resistance—i. e., about five-eighths inch resistance. Distance of tube from patient, 12 cm., first exposure 7 minutes; intermission of a week to learn the susceptibility of the patient. Afterward give daily exposures of five min-

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utes. Author's comments: "Rapidly growing and ulcerating epitheliomas are affected quickly."

ENGLISH REPORTS.

Sequira reported twelve cases of rodent ulcer Feb. 9, 1901 (British Medical Journal), eight under treatment, four cured. Primary current, three to four amperes, ten-inch coil, tube six inches from patient. Treatment ten minutes daily. (Note the absence of any reference to the vacuum of the tube.)

Cecil R. C. Lyster, superintendent Bolingbroke Hospital.—Epithelioma of lip. Treated daily for five days, then period of "congestion." Resumed treatment in one week. Used a Wimshurst machine.

James Startin, senior surgeon to the London Skin Hospital, in the Lancet July 20, 1901, reported two cases of rodent ulcer, both of them showing improvement at once. He used a coil with mercuric interrupter at a speed of 250 per minute. Tube placed five inches from anode to skin, giving four or five exposures on consecutive days.

Cooper in an address before the West London Medico-Chirurgical Society, published in the Lancet of Oct. 12, 1901, says that a number of cases of rodent ulcer have been treated in the West London Hospital by the X-rays. Technique: Twelve-inch spark coil, tube five inches from ulcer, exposure daily ten to fifteen minutes. The ulcer healed in from one month to six weeks. He mentions a scirrhus of the breast treated by Clark. Technique: Exposure five days per week for fifteen minutes each day, and at the end of two months general improvement. Patient 60 years old. The author says this is the only case of cancer of the breast he could find treated by the X-rays.

In the Lancet of January, 1902, W. Allen Jamieson reported a case of rodent ulcer treated by the X-rays. Patient a woman 41 years old in general good health. Several ulcers on the forehead limited to the skin. Treated three weeks by X-rays. Patches scraped and on next day cauterized by chromic acid. Exposures ten minutes four times per week.

In the Lancet of May 17, 1902, G. G. Stapford Taylor reported a case of rodent ulcer. Patient 82 years old. For twenty years had small chronic ulcer on right side of nose. Usual methods of treatment failed. X-ray treatments begun May 15, 1901. Current three amperes for twenty minutes twice weekly. From June 12 sittings four times per week. Up to Aug. 19 healing slow, when dusky red erythema developed. Treatments suspended. Erythema caused by a change from a high tube to low vacuum tube. In five weeks reaction gone. Spontaneous healing very rapidly. Oct. 15 only small area left. This was treated. Author's comments: "I believe the small spot reluctant to heal occurred where I had made the application of potassa fusa six years ago." Treatments completed Dec. 20. He also exhibited several cases of rodent ulcer at the Liverpool Medical Institution, but the report did not describe the technique.

In the issue of April 12, 1902, of the British Medical Journal John W. Pugh recorded four cases of rodent ulcer cured. Treatment: Coil ten-inch spark. Sittings five minutes twice per week. Increased to ten minutes exposure. Tube at first six inches from ulcer, afterward four inches. One man 93 years old; thirty-six sittings. Not much improvement until marked dermatitis produced by daily exposures of ten minutes. Then healing set in rapidly. Ointment of lead with opium used.

In the British Medical Journal of May 31, 1902, Dr. G. H. Lancashire, assistant physician to the Manchester and Salford Hospital, contributed a paper on the "Therapeutic Employment of the X-rays." He first gives his technique as follows: Tube eight to nine inches from skin; exposures ten to fifteen minutes, and periodic rests from treatment. Suspend treatment when the skin becomes too red. Uses the apparatus modeled after the plan of Schiff and Freund. Twelve-inch spark coil, mercury interrupter about 600 per minute, four to five amperes in primary. Soft tube, one giving plenty of green fluorescence. Discard a tube too high. Exposures daily for first week or two. After the reaction has set in, sittings three per week. He mentions the various lesions treated: Hypertrichosis, Coccogenic Sycosis, Lupus Vulgaris, Rodent Ulcer. The ulcerated epithelioma responds more quickly than the non-ulcerated.

The reports in these two prominent British journals are given in some detail because of the interest attached to the work in England. As seen by the dates, reports include the work up to the last five months. We note that, except in the later reports, no mention is made of the vacuum of the tube.

Returning to reports in our country, we note the technique employed by Dr. Clarence E. Skinner. Because of its interest, his views on the therapeutic effect of the rays are given: "I do not consider the effect of the X-rays as due to ozone formation, electrification, or electrolysis of the elements of the growth, the deposition of nitrous acid upon the sore or any other of the ingenious, but in many cases far-fetched explanations, which have been advanced to the exclusion of a specific influence of X-light." He holds that the X-ray revitalizes the cells of the invaded tissues.

Dr. Skinner believes it is necessary to produce a slight dermatitis in those cases that do not yield to treatment. In several external cases the improvement was rapid only after the dermatitis had appeared. In other intractable cases treatment was discontinued for a few days after the appearance of the dermatitis, when the improvement was sudden and rapid. Illustrative case: An old lady over 80 was treated for epithelioma of the face. Eight treatments produced no improvement; treatments were discontinued for a week, when three-fourths of the area was healed over. She subsequently fully recovered. Dr. Skinner

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recommends a coil where a dermatitis is desired. He shifts from static machine to a coil for intractable cases, but in all others he prefers the static machine.

He recommends treatments on alternate days for the first two weeks, which will reveal the patient's susceptibility to dermatitis. He places the anode of the tube about ten inches from the skin of the patient and gives a fifteen-minute exposure with a static machine. He uses a high tube for all growths that extend three-fourths of an inch or more below the skin. For superficial growths he uses a low tube.

After two weeks, if no dermatitis is produced, exposures may be made every day for four or five days, after which they should be discontinued for an equal period.

Dr B. W. Snow reported two cases of epithelioma, noting that the cure of one was accelerated by static sparks from a maple stick electrode. He recommends the static brush discharge be used on alternate days with the X-ray.

Dr. C. W. Allen's technique: He does not wish to produce a burn. The first sittings are short, with the tube not too close—from three to five inches. He prefers a low tube—the fluoroscope showing a dense, black shadow, with no differentiation of tissues. The time of exposure ranges from three to thirty minutes, the usual sitting being fifteen or twenty minutes. The tube should be in harmony with the kind and power of the electric supply. He prefers a static machine for office work.

Epithelioma of the uvula and soft palate by McCaw of Watertown. As much of the growth removed as possible, followed by irradiation, using the method of Beck. Result, recovery.

The work of Dr. W. A. Pusey hardly needs comment among a company of Chicago physicians. In the Journal of the American Medical Association, April 12, 1902, he gave a report of his work with the X-rays. In this article he gave detailed histories of seven cases of epithelioma, some of them very extensive.

In case 6, woman 68 years old, epithelioma involving the nose, the septum and probably the turbinated bones. Treatment daily for four months, producing at one time an acute dermatitis, the healing being unretarded by the stopping of the treatment while waiting the subsidance of the reaction.

Case 12—Man 35 years old. Epithelioma, recurrent after extensive operation, involving the right eye and orbit, upper and lower lids, the side of the nose and cheek. The eye was enucliated before X-ray treatment began. Almost daily exposures were given for about six weeks, the borders and nodules constantly shrinking and the ulcer diminishing in size. The exposures produced erythema, but no weeping. Case still treated, though all ulcerations vanished.. Author's comments: "The above is a list of consecutive cases of epithelioma and I believe all of them can be claimed as successful. That there will not be recurrences time alone can show, but from the character of the scars I am willing to hazard the opinion that these cases will not show an unusual proportion of recurrences. If recurrences do take place *in situ* there is every reason to believe that their management would not be troublesome. I do not believe any other method of treatment can show such results in epithelioma as some of the above. Take, for example, Case 6 and Case 12; the results are unique. Case 12 was beyond relief by any other method. That the ulcer in his orbit should have filled up and healed over with healthy skin would not be regarded as possible were the patient not demonstrable. Such a result in such a case is, I believe, entirely unique.

"My experience in epitheliomas is such as to give me great confidence in the method. I have had no case thus far in which the disease failed to yield and usually yield promptly. The scars are soft, free from induration, smooth and of the color of the normal skin or white, and absolutely healthy looking; indeed, there is almost no scarring."

Dr. Morton's cases: Epithelioma of the face, large crater in a state of sloughing. Extensive indurated area about ready to break down; the edges of the ulcer presenting raised, pearly edges, the invasion inwards reaching to the roof of the mouth. Treatments three times per week; tube of resistance equal to a seven-inch air gap. Two epitheliomas in fauces arrested.

CARCINOMA DEEP SEATED.

In the British journals Ferguson reported a carcinoma over the manubrium sterni; exposed twenty minutes for twenty days; cure. Peters reported a scirrhus of years' standing, recurrent after operation. Treatment: Ten-inch coil, medium tube, two to four inches from the skin. Exposures two to three times per week, lasting from ten to twenty minutes.

Dr. Skinner's cases.—Five cases of intra abdominal cancer. Tubes 4-8 in spark resistance; anode 8 to 10 inches from patient's skin; treatment from 15 to 20 minutes.

Case 1.—Carcinoma originally of cervix uteri; recurrent after two operations. Examination showed tumor in cicatrix in anterior abdominal wall large as small orange; ulcer in vaginal vault size of silver dollar; profuse discharge.

After six treatments no pain. Discharge a trace; ulcer size of dime; tumor smaller.

Case 2.—Carcinoma of cervix uteri; perforation of bladder. Has had seven treatments. Pain relieved after second treatment; bloody purulent discharge only a stain.

Case 3.—Fibro-sarcoma; microscopic confirmation of the diagnosis; inoperable; recurrent after removal of ovaries. Tumor ten inches laterally. Stony hard. After three treatments softened to depth of one inch.

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In six cases of carcinoma of the breast three were successful. He recommends operation first, followed by the X-ray.

Morton's Cases.—Four carcinomas of the breast. The first very extensive, recurrent after thorough operation, fetid discharge from an extensive ulceration, the second involving the breast and upper third of the sternum; the third the left breast being involved and enlarged lymphatic gland in axilla; the fourth a nodule in the breast the size of a pigeon's egg. Technique: Prefers a high vacuum tube energized not too strong by giving a blurred definition in the fluoroscope. Aims to produce slight erythema, which, under the radiation of a high tube, will produce a tan. The treatments may then be given more frequently and the exposures lengthened, as the tanned surface will stand very severe radiation.

Dr. Beck of New York has treated ten cases of recurrent carcinoma; three with detailed reports were shown to be extensive, involving the breast and extending to the axillary glands. In all these marked improvement was noted.

"The soft tube is the tube par excellence in the Roentgen-therapy of integumental and subintegumental growths. Deep-seated or visceral tumors, like carcinoma of the stomach, for instance, are also reached by the rays, provided hard (deep-penetrating) tubes are chosen. But their influence is too weak then to warrant cell-metamorphosis.

"As to the technique of Roentgen-therapy, it is advisable to expose for five minutes at first, and after a week for about ten minutes. If, after a third exposure, two weeks after the first exposure, no reaction has been shown, the patient apparently is not liable to have an idiosyncrasy. Then he may be irradiated every second or third day, and at last daily until intense reaction shows itself.

"During the tentative exposures the distance of the tube should be four inches, later on it may be one inch only. Some patients like the direct contact with the tube, and I have seen no harm from it in resistant individuals.

"If a large area is to be irradiated the distance of the tube must be greater than if small foci only are to be exposed. Tumors of globular shape must be irradiated from different sides so that all surfaces may be equally well reached.

"In benign integumental diseases a shield of lead must be fastened over the area to be irradiated. It may be attached to a bandage. To the uneven surface of the margin tinfoil or a piece of cork may be added. Corresponding with the area to be irradiated a hole is cut in the shield. In the treatment of malignant growths, however, the use of a shield is improper, since it is intended to have the influence of the rays extend as far as possible. During the intervals xeroform-salve (1 to 10 lanolin) should be employed."

Dr. Pusey's cases.—He reported six cases of carcinoma of the breast, three of which were under treatment less than six weeks. The other three, recurrent after removal of the breast, involving neighboring lymphatics, are apparently cured. Treatment in one case produced a bulla over the center of the tumor. He also reported six cases of carcinoma of the neck and head, none of them being successful, though showing marked improvement for a time. They were all much advanced before the treatment began.

SARCOMA.

Dr. Pusey reported three cases. One of the neck: there being a tumor on each side at the angle of the jaw, one tumor being removed by operation; the other was treated with the X-ray and disappeared in about a month. The other two cases were far advanced before treatment began and the only benefit was relief from pain—a result of much importance to the patient.

Beck's cases.—Sarcoma treated in 1901, involving the lower third of the tibia with sarcomatous tumor in the groin. Result, case much improved; still under treatment at the time of the report. Tube used, low vacuum. Treatments, short exposure given at intervals of a week until the susceptibility of the patient was revealed. Treatments then crowded.

CONCLUSION.

From the above reports are we in a position to decide in favor of some technique? At first sight there seems to be a wide discrepancy in the various methods used. At least, one thing seems established. The low tube is in most frequent use for superficial growths. A considerable number of reports show that healing of ulcerated epitheliomas was slow until a considerable dermatitis was produced. Furthermore, there seems to be a number of cases of carcinoma that have responded favorably to treatment from a medium or high tube where the superficial reaction was slight, and other cases with no permanent improvement when treated with the low tube. All advise excision of the growth where possible, followed by irradiation.

The use of a low tube powerfully excited seems to be preferred in the various species of sarcoma. Some operators stop the treatment at the first sign of dermatitis, others aim to produce considerable superficial reaction.

DISCUSSION.

Dr. Grubbe said he believed in scorching the diseased tissues. He distinguished between the ulcerating and non-ulcerating lesions; in the former he produces an actual burn, in the latter a retarded burn, but in both cases an actual destruction of the superficial layers. In cases of osteo-sarcoma he uses a high tube, one equivalent to a seven or eight inch spark. He believed that the poor results obtained by some operators can be assigned to their stopping the treatment too soon. Even two or three months of treatment is too

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short a time to decide upon radical operation instead of continuance with the X-ray, especially so if the operation be amputation. In all cases the treatment should be pushed. In long courses of treatment dermatitis develops and ultimately a burn, but when this heals we usually find that the lesion has been eradicated. Primary growths react more favorably. He wished to comment only on osteo-sarcoma.

Dr. Fitch asked whether any member had any cases develop toxemia while under treatment.

Dr. Grubbe said he had had several cases suddenly taken with general septicaemia, but these were in a desperate state before the treatment commenced and the sudden collapse he regarded as an inevitable ending. The X-ray certainly relieved the pain.

Dr. Fitch then spoke of a case of carcinoma of the breast. Technique: Daily exposures of twelve minutes, with a medium low tube at a distance of eight inches, tube excited by a two-plate mica-plate machine. All the symptoms showed improvement for a time until there was a sudden collapse, with symptoms of general septicaemia. There was no secondary disease.

Dr. Burdick thought the general infection could not be attributed to the X-ray, especially as the tube was excited by such a small machine. He held that collapse is sudden in all fatal cases of cancer. The patient is usually strong until a few days before death.

Dr. Pratt stated he had been at the meeting of the American Electro-Therapeutic Association at the Hotel Kaaterskill Sept. 2-4. He went there to find out what others knew about electro-therapeutics and was surprised to find that the meeting was converted into an X-ray meeting; all the papers excepting three were on the X-ray.

He found that there was no agreement in the technique used by the different operators. Morton uses a high tube, others low tubes. He afterward called upon Dr. Morton in his office in New York and after Dr. Pratt had explained some things Dr. Morton said he could now account for something he could not before. Carcinomas of the breast, will heal on the surface, but this is produced by alterations from the ends of the high tube, not from the X-ray.

Dr. Pratt holds that the ray should pass through a celluloid screen and thus get rid of these superficial alterations and you thus will get a deep penetration. All agree that the patients die afterward. Not enough lines of force are thrown out by the tube. He uses a low tube and crowds it hard—he produces a burn. The distance depends upon the tube, but he often places it one inch from the patient. He wants to get the greatest number of lines of force thrown out so that every cell and all bacilli will be included in these lines and will thus be decomposed. "Not necessarily due to my superior skill, but fortune seems to have favored me and I can say that I have had less deaths than any other worker in this line."

If there is a large septic mass he would treat it for six or eight weeks and then have it removed by operation. The treatment should then be resumed.

Another point he wished to mention: Several operators, among them Skinner and Snow, used the static breeze. This is a very bad plan. Ochsner says on the treatment of an infected finger, "Hold the finger, but do not rub it, because you would pump the infection into the system." The static breeze pumps the infection of a cancer into the system. He lost several cases until he discovered this error. Morton, Skinner and Snow have buried patients due to this mistake.

The current produces electrolysis. It increases the normal changes in the tissues and the septic mass must be eliminated by the bowel or otherwise. If the system is unable to do this the patient falls over dead.

Comments: The way the discussion of the last speaker struck the members of the society is shown by the action taken immediately after. The report of this action is on the editorial page.

ON THE DOSAGE IN RADIOTHERAPY.

By George G. Hopkins, A. M., M. D., of Brooklyn, New York.

The at present unknown way in which this therapy deals with disease may any day come to be understood. The recent discovery of their ability to photograph electrical discharges by Lord Armstrong and Mr. Kinraide should lead us to hope that X-ray phenomena may yet be photographically demonstrated. Should there prove to be a difference in the current effect varying in accordance with methods of energizing and the exhaustion of the tube, a decided advance will have been made in our efforts to arrive at a definite dosage in the cure of disease by the Roentgen ray.

This subject of dosage is the great difficulty to be overcome by the X-ray therapeutist. It is earnestly hoped that all those who are working in this field of medicine will concentrate their energies on this vital point and aid in its solution. Could we accomplish this object a vast stride would be made in this new therapy, removing it entirely from the empirical and placing it in the category of exact and scientific treatment. This step determined, the rest will follow more easily; but until we can arrive at some very definite method of determining dosage we are, in a measure, groping in the dark with a very powerful remedy.

That tubes vary goes without saying; but that the same tube, energized by different sources of energy, will present varied conditions of fluorescence, is not so generally recognized, but is an undoubted fact. With the same energizing machine, in varying states of the surrounding atmosphere, the tube will behave very differently at different times.

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Those who have used both the coil and the static machine as sources of energy cannot have failed to notice that the tube will vary less in hardness and last much longer if the energizing source is a static machine than when such energy is derived from a coil.

The X-ray therapeutist is striving to find a method for keeping the tube at a uniform vacuum, which would mean a more uniform dosage than we have yet been able to secure. All the so-called self-regulating tubes on the market are unsatisfactory.

The best means we have to-day for determining the condition of a tube as to vacuum is to watch it constantly with a fluoroscope.

That the tube energized by a static machine is more constant in its vacuum and action is proved to my mind conclusively. I have used a low vacuum tube so energized 225 hours in the aggregate, covering a period of nine months, the exposures varying from eight to fifteen minutes each, in the treatment of patients; and at the end of that period I could not discover any variation in the radioscopical appearances. Yet with a tube to all appearances identical and constructed by the same makers I have been unable to get half a dozen hours' uniform work. This emphasizes the importance of keeping on hand a number of tubes supposedly of the same vacuum and of the same make, so that our treatment may be conducted throughout under as nearly as possible uniform conditions as to dose.

In my article on X-ray burns (in the Philadelphia Medical Journal) it was shown after an exhaustive search of the literature on the subject that tubes energized by the static machine current had much less to answer for in the way of burns than those energized by the coil. Subsequent investigations and my own experience have served only to strengthen my position on this point. For myself I have been so fortunate as never to have caused a single patient any inconvenience beyond a slight blush of the epidermis, giving rise to a mild itching sensation; and these few cases have returned to normal condition in 48 hours from the time of infliction. Tanning of the skin in some cases has been very marked, but never causes any inconvenience of the treatment.

Dr. Carl Beck has formulated the best rules that I have seen laid down on the initial dosage with new patients. By observing his precautions we can feel sure that very little harm can come to our patient while instituting our treatment with this powerful remedy, which, in careless hands, has done harm where good was sought.

This note is put forth in the hope that it may lead many of my fellow-laborers in this new field of therapeutic research to make common cause in establishing a uniform rule of dosage in the treatment of hitherto incurable diseases.—Philadelphia Medical Journal.

Comments.—Judging from the reports thus far submitted, the most we may expect is that certain types of cancer will be treated according to a definite technique after the susceptibility of the patient has been revealed. It must be said, however, that, though the technique has not become standardized, the reports of the most successful operators show that they undertake the treatment of a case with some degree of confidence; each has developed his individual method. We fail to find in the reports of users of the coil that their tubes cannot be held at a definite vacuum during the treatment of a case. Few tubes would hold their vacuum for a long exposure if excited by the full power of a coil; but this intense excitation is not used in very long exposures.

THE RATIONAL PROCEDURE FOR THE REMOVAL OF FOREIGN BODIES FROM THE LOWER PORTION OF THE ESOPHAGUS.

V. Hacker (Beitraege zur Klinischen Chirurgie, Bd. xxxii, Hft. 2).

The vast experience of the author in this field makes anything from his pen well worth reading. He opens by saying that an "X-ray" of such a patient is of value only when the individual lies half on the side, since the shadow of the vertebræ must otherwise obscure the field. In an adult it is quite impossible to bring the tips of two fingers together if the one hand be introduced through the stomach and the other into the esophagus through a wound in the neck. For examination of the tube by way of the cardia, a median abdominal incision gives the best general results, though this route has not been always chosen by any means. The difficulty of this procedure must differ in the various cases, since it is influenced by the length of the thorax, by the size and position of the liver, as well as by a number of other factors. In fact, a foreign body is always to be removed from above by the aid of the esophagoscope, unless it be very near the cardiac orifice. With the abdomen open one can usually gain much knowledge upon this point before the stomach has been opened, and then if a stomach wound is found desirable at all it will be found to injure the vessels less, if this be made across the longitudinal axis of the organ.—Interstate Medical Journal, May, 1902.

BOOK REVIEWS.

From time to time we shall review books that are especially interesting to electro-therapists. We have a book from Blakiston's Son & Co. which our readers will vote enhances the value of our journal—Gould's Medical Dictionary. The physician who wishes to be exact, both as to spelling and correctness of medical terms, needs such a dictionary. Gould's is a most satisfactory book. The different terms are readily accessible. Enough matter is given to set one right on any term. It needs no introduction to the medical profession. It should be in every physician's library.

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NOTICE.

There will be a meeting of the reorganized Chicago Electro-Medical Society, Oct. 30, at 8 p. m., in the Schiller building, Rooms 301 and 302. A large attendance is desired. Dr. C. S. Neiswanger will read a paper, entitled: The Value of Special Education in Electro-Therapeutics.

Doctors, show your appreciation of our journal by sending us your subscriptions now.

EDITORIAL STATEMENT.

At the meeting of the Chicago Electro-Medical Society, held Sept. 28, a motion was made and seconded that the society be disbanded. A large majority favored this, and after the vote left the hall.

Several who were not members arose to oppose the motion. They are not counted. The following is the vote of the members:

Absent members:

J. E. Gilman, M. D.
F. H. Blackmar, M. D.
A. W. Baer, M. D.
E. E. Prescott, M. D.
H. P. Fitzpatrick, M. D.
L. D. Rogers, M. D.
W. R. Burch.

Members voting no:

Mr. F. S. Betz.
Mr. R. S. Gregg, assistant of Dr. H. P. Pratt.
Mr. C. H. Upton, assistant of Dr. H. P. Pratt.
J. P. Hall, M. D., assistant of Dr. H. P. Pratt.
R. H. Bartlett, M. D.
H. P. Pratt, M. D.

Members voting yes:

G. G. Burdick, M. D.
R. H. Street, M. D.
E. H. Grubbe, M. D.
J. C. Brubaker, M. D.
W. P. Coons, M. D.
C. M. Fitch, M. D.
Prof. C. H. Treadwell.
Mr. A. B. Slater.
Mr. W. Scheidel.
Mr. H. H. Harwood.
Mr. R. Friedlander.

They at once had a meeting and a new society was organized. Incorporation papers have been obtained and the society will keep the name of the Chicago Electro-Medical Society. From the daily papers we learn that those left in the room held a meeting and will claim the right to the old name.

Physicians at large are not interested in local affairs and feel in addition that it is unworthy scientists to come to personal disagreement. It is because we appreciate this sentiment that we shall briefly state a few facts which seem to justify such a radical step.

Dr. H. P. Pratt has been trying to convert the society to an acknowledgment of his priority in the use of the X-rays for therapeutic purposes. His original communications appeared for the most part in the daily papers of Chicago. So far as we know, they have not been recognized by any of the leading X-ray therapists in this country or Europe. A committee of which he was a member, an office associate chairman and Prof. Treadwell were members of this committee. The chairman, Dr. Hall, prepared a report on the therapeutic uses of the X-ray in 1896. This re-

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port was shown to Prof. Treadwell, who signed it. It was duly reported to the society as a preliminary report. The article mentioned the work of other investigators, Dr. Pratt's articles in the daily papers being among them. Only one article of his on a case of pulmonary tuberculosis was published in a medical magazine. What the American Roentgen Ray Society thought of this is well known by all who attended the meetings at Buffalo last September. It was moved that the secretary be appointed to send on this report to other societies in order to get a full report of the work in 1896.

Before the following issue of the official organ of the society this report was printed in an announcement of the Electro-Medical School, familiarly known as Pratt's school.

This journal refused to publish the report. Dr. Hall, the secretary, brought up the matter at a later meeting and said he could not correspond with other societies without expense unless the official organ would publish it. Dr. Pratt sauvely said it would be necessary only to authorize the St. Louis Medical Journal to publish the report (the same journal was acquired by Dr. Pratt in August). A heated discussion followed, in which Prof. Treadwell stated he regretted his hastiness in signing the report, which was made a personal advertisement and which included newspaper articles with those of eminent scientists. The society rescinded its instructions to the secretary. The report did not die, however. Allusion to its unanimous approval by the committee of scientific investigation appeared in the first issue of the journal, of which Dr. Pratt is managing editor.

Other points of a somewhat similar nature indicated that the society had developed two factions—those for Dr. Pratt, those against such practices and pretensions. A good example of his conceit is shown in the discussion when he compared his work with that of the noted physicians in New York.

We shall not allude to the matter in the future, as we think our readers demand only the reports of general scientific interest.

AN ADDITIONAL CASE OF TUMOR OF THE BRAIN, LOCALIZED CLINICALLY AND BY THE ROENTGEN RAYS.

By Charles K. Mills, M. D., of Philadelphia, Clinical Professor of Nervous Diseases in the University of Pennsylvania; Neurologist of the Philadelphia Hospital.

Roentgen Ray Investigation by G. E. Pfahler, M. D., Assistant Chief Resident Physician, Philadelphia Hospital.

Operation by J. B. Deaver, M. D., Surgeon-in-Chief to the German Hoipital.

In the Philadelphia Medical Journal for February 8, 1902, the writer, in association with Dr. Pfahler, reported a case of tumor of the brain located clinically and by Roentgen ray investigation, this being the second case located during the life of the patient by such investigation. In the following case a shadow of the tumor was obtained, this coinciding with its position as determined by careful clinical study. The tumor, which was removed entire, was the largest I have ever seen taken from the living human brain. The operation was performed in two stages, as at the time of the first operation, owing to the profuse bleeding, it was deemed imperative to stop in order that the patient might not die from hemorrhage; and the case is of interest not only from the standpoints of the clinical localization of the tumor and of its yielding a shadow to the Roentgen rays, but also because of the means adopted at the second operation for controlling hemorrhage—the regulated compression of both carotids before and during the operation. The patient died a few hours after the operation; nevertheless, my experience with this case only makes me more decided in my convictions that operation should be resorted to in most cases of brain tumor when the neoplasm can be located in a region accessible to the surgeon's knife. This tumor was of enormous size, but it was encapsulated, and if it had been removed earlier the result in all probability would have been different. Much erosion of the inner table of the skull had taken place, and this was accompanied by increased vascularity, the dangerous hemorrhage seeming to come chiefly from the diseased bone, which disease had evidently come on gradually as the tumor increased in size.

The patient came to me with a letter from Dr. A. B. Gilliland of Van Wert, Ohio. She was 21 years old. The apparent beginning of her symptoms dated back three years, when, while going down stairs one day, she felt her left leg give way. She was not unconscious, but was numb in the left half of her body and her speech was somewhat thick, the condition lasting about an hour. From this time on she had attacks of weakness and numbness in the left arm, leg and trunk and sometimes in the face and tongue. At about the end of the first year she began to have very severe and almost continuous headaches, having had them off and on previously. She gradually lost power in the left arm and leg and became more and more awkward in using them.

Her paternal grandmother died of cancer of the breast; her paternal aunt of cancer of the stomach and a first cousin of her father also probably of pyloric cancer.

In April, 1901, it was noticed that she was losing her sight, at first in the left and soon after in the right eye. In a month or two she was entirely blind. The report of Dr. S. D. Risley, which shows atrophy with some remnants of a former optic neuritis, is as follows: The pupils react promptly to light and shade. The motility of both eyes is normal. The ophthalmoscope shows far advanced atrophy of both optic

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nerves, with small arteries and veins and much remaining infiltration of the disc, probably a late stage of choked disc. The swelling is almost gone in the right eye, leaving a chalky white surface and sharp nerve margins in a portion of its circumference. On the left side the nerve is still swollen to 3 D., but the arteries are small and the swelling obviously subsiding.

For a time her headaches were better, but during the last six months became worse again, although not nearly so bad as two years ago. She also had a history of spells of dizziness and vomiting at irregular intervals.

Examination showed marked hemiparesis in the left upper and lower extremity, rather more marked in the former. The left side of the face was slightly paretic. The patient had a distinctly hemiparetic gait. Her left arm was held slightly flexed at the elbow, fingers and thumbs of the left hand also being carried partially flexed. The left arm could be lifted with difficulty to the level of the shoulder. Movements of flexion and extension of fingers, hand, forearm and arm could be performed, but were accomplished feebly and awkwardly. The grip of the left hand was extremely weak.

The movements of both the left extremities were distinctly ataxic. Attempts at using the arm evoked an ataxic tremor.

The deep and superficial reflexes were exaggerated on the left side. Knee jerk was much increased on this side. The front tap phenomenon, ankle clonus, patellar clonus and the Babinski response were also present on the left.

Cutaneous sensation was tested for touch, pain and temperature, and was found to be normal in both left lower and upper extremities. Testing on the sole of the foot for power of recognizing whether a pencil or other object was placed lengthwise or crosswise, she answered correctly about seven times out of ten on the left, correctly and promptly on the right. When dice, small marbles and other objects were grasped by the toes, first of the left foot and then of the right, her recognition of their form and size was slightly better on the right than on the left. Testing the stereognostic sense on the left hand, she recognized several objects correctly, as a marble and a small pencil, but more slowly than in the right; other objects, as a dice, a coin and the finger, she failed to recognize correctly. Close investigation showed impairment in motor power in the fingers of the left hand, so that she had much difficulty in grasping and manipulating the objects, raising the question of how far the astereognosis present was of a pure type or was in part or altogether a mechanical or pseudoastereognosis due to motor impairment.

Hearing was acute on both sides.

Smell was obtunded on both sides.

At one examination taste was lost on the left and delayed on the right on the anterior part of the tongue; on the posterior part of the tongue, salt was tasted promptly on the left as well as on the right. A second series of examinations regarding her taste showed that she recognized a sweet substance on the anterior part of the tongue on the left side as well as on the right, and that she recognized salt on the posterior part of the tongue on the left side as well as on the right. Examination for taste, in other words, seemed to give somewhat varying results, the last examination showing its retention and the first its absence in part.

The patient's physical condition as brought out by several protracted and somewhat tiresome examinations was excellent. Her power of sustained attention was good. She differentiated between various tests as to taste and cutaneous sensation. Her memory was good. She was unemotional.

The patient was seen in consultation by Dr. F. X. Dercum, Dr. James Hendrie Lloyd, Dr. William G. Spiller, Dr. J. W. McConnell and Dr. W. J. Hearn. After several careful examinations my view was confirmed that a tumor was present, probably of large size, and extending from the prefrontal into the postparietal region.

Arrangements were made with Dr. G. E. Pfahler to have a Roentgen ray investigation. The report of Dr. Pfahler is as follows:

"The skiagraph made in the case of Miss H, July 8, 1902, shows the normal details of the skull as follows: The scalp, the outer and inner tables of the skull, the occipitoparietal and frontoparietal sutures, the frontal, ethmoidal and sphenoidal sinuses, the roof of the orbits, the sella turcica, the external auditory meatus and the mastoid cells. It is important to obtain the above details before reliance can be placed upon any abnormal shadow. An abnormal shadow about three inches in diameter and irregular in outline is found lying directly across the region of the fissure of Rolando. This was interpreted before the operation as a shadow of the tumor. The middle meningeal artery and its branches are seen to pass over the anterior portion of this shadow. The inner table of the skull is seen to be disorganized over the region of the tumor. This fact was not interpreted before the operation, but can be seen in the negative. This disease of the bone has probably rendered the shadow in the region of the tumor less definite than it otherwise would have been. The negative was made on a hot, damp day, which conditions are unfavorable. The negative, however, shows good details, but is not strong and therefore many of the delicate shadows cannot be reproduced in print. A white cross indicates the central portion of the tumor-shadow."

The negative obtained by Dr. Pfahler was examined by Drs. Spiller and Dercum and by the writer, and all concurred with Dr. Pfahler in the view that a

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shadow of the tumor was obtained, as indicated in the above report. The shadow, while distinct, was not very marked.

While it was clear that nothing could be done to restore the patient's sight, as the case was one of a progressively enlarging neoplasm, it was probable that in the near future she would have had complete paralysis with convulsions, increase of headache and other distressing symptoms. I therefore, although at first somewhat reluctantly, advised operation for the removal of the tumor. The patient was admitted to the German Hospital of Philadelphia under the care of Dr. John B. Deaver.

On July 17, 1902, she was carefully prepared for operation. The central fissure was located. It was agreed if possible to make an osteoplastic operation, using the Stellwagen trephine. This valuable instrument, the invention of Dr. T. C. Stellwagen, Jr., of Philadelphia, has been described in a recent publication by Prof. J. Chalmers DaCosta of the Jefferson Medical College. It consists of a shaft with a quadrilateral hole through which is passed a piece of steel which fits into a plate furnished with pins for fixing the plate to the scalp and skull. The projection bar or shaft has a gear-hole in its outer or cutting end, into which can be fitted a knife for incising the scalp and later a saw for cutting the bone. For details regarding this device and the methods and advantages of using it the paper of Dr. DaCosta can be consulted.

A point was chosen for the insertion of the pins of the Stellwagen trephine in front of the line of the central fissure, one and a half inches from the mesal line of the skull. The knife for cutting the scalp was attached to the movable arm of the trephine, which was set so as to give a radius of one and one-quarter inches. This would have given an opening of two and one-half inches anteroposteriorly and about two inches from above downward, the operation being so planned as to have the hinged portion of the scalp and bone flaps below. As soon as the incision in the scalp was completed a profuse hemorrhage occurred. The hemorrhage seemed to come largely through the bone, and, as it could not be fully controlled, it was determined to raise the scalp and trephine rapidly to explore. A trephine opening of three-quarters of an inch in diameter was made, the hemorrhage becoming more alarming. The button of bone was found to be much eroded and corrugated on its inner surface. It was evidently abnormal, having been eroded by a growth or having taken part in adjacent malignant disease. It was concluded that it would be better to pack the wound so as to control the hemorrhage and postpone the completion of the operation, determining later as to the advisability of a second operation.

The patient did well after the wound was closed and soon recovered much of her former strength.

Further consultations were held and it was finally decided to reopen the wound and, after new measurements, to enlarge the opening with trephine and rongeur to such an extent as to allow the removal of the large tumor which was supposed to be present.

Owing to the hemorrhage which occurred at the previous operation and to the probability that it would recur and again threaten the life of the patient while on the table, it was decided to take additional advantage of the new method of temporarily closing the carotid arteries in order to control hemorrhages during cranial operation, recommended by Dr. George Crile of Cleveland, Ohio. It has been shown by this surgeon that both carotids may be temporarily clamped with especially constructed appliances for a period varying from a few minutes to twenty-four and forty-eight hours, the operation being conducted with great care and with complete aseptic or antiseptic precautions. For a description of the clamps employed and for technical details the paper of Crile should be consulted. Crile reports a series of cases in which temporary clamping of the carotids was employed, including operations for the removal of a fibrosarcoma of the roof of the mouth, of a congenital tumor of the neck, of the floor of the mouth and of the submaxillary, parotid and other glands; for excision of the tongue, removal of portions of the jaw, excision of the carcinoma involving the parotid duct and other important operations of the mouth, neck and head. No case of brain tumor or other intracranial operation is included in his list. It is probable that our case is the first in which the method of temporarily compressing the carotids has been used in an intracranial operation, or at least in an operation for brain tumor.

After clamping both common carotids, the flap of the previous operation was thrown back and a new trephine opening was made, half an inch back of the former opening, counting from periphery to periphery of the openings.

The measurement showed that the trephine opening made at the first operation was probably situated about half an inch in front of the central fissure, so that the anterior limit of the second opening was at about the line of this fissure. The rongeur was then used to chew out the bone between the two trephine openings, and the entire opening was enlarged, most backward and upward, but also to some extent in all directions. When complete, the opening was about two and one-half to three inches in the anteroposterior direction and a little less from above downward.

Nothing was visible on the outer surface of the dura. It was noted, however, that there was little or no pulsation, which it was thought might have been partly due to the clamping of the carotids. Palpation of the dura with the finger gave a sensation unlike that felt when normal brain substance is present within the membranes. At the posterior limits of the opening

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the sensation was as if a shallow cyst might be present, while in other directions the tissues were tense and resistant.

While some hemorrhage had occurred, the bleeding was not serious and was readily controlled. The dura was now incised along the anterior, superior and posterior border of the opening, when a large tumor was found entirely filling the opening and extending beyond it under the ledge of bone. It presented to the eye a dark purplish appearance. Passing the fingers under the bone, the mass was quickly enucleated. It proved to be an encapsulated growth, three inches in length and of an ovoid shape. A photograph of the tumor is shown in the illustration, Fig. 2. The tumor was slightly adherent to the dura. It did not infiltrate the brain susbtance. It had probably grown from the pia and had slowly made for itself a bed in the brain substance, at the same time causing erosion of the skull. I have several specimens of the skull in my possession, all of which show much erosion and irregularity. At several points the skull was thinned to perhaps one-third or one-fourth of its ordinary thickness. A fragment of the tumor was examined microscopically by Dr. Spiller, whose report shows that it was a spindle-cell sarcoma.

Each stage of the operation was performed with precision and rapidity. Every preparation had been made in advance and no unnecessary time was lost. The whole operation was completed in about one hour, this including some time which was taken to transfuse the patient with saline solution toward the end of the operation. During the last half of the operation the patient's condition several times became somewhat alarming, but after transfusion and injection of atropine and later of strychnine, her condition improved. I noticed also what I have seen in several cases of operation for brain tumor, that the general condition of the patient improved immediately after the mass was entirely removed.

The wound, after packing with sterile gauze, was closed and the patient rallied so that she was removed to her room in the hospital. When seen by me one hour after the operation, her pulse was comparatively good and she was beginning to recover consciousness. Hypodermic medication, the application of heat and all other usual measures were taken to maintain life, but later she began slowly to lose ground and died between three and four hours after the operation.

This case presented many points of unusual interest, but I shall not go into lengthy comments, rather leaving the bare record to speak for itself.

The study of this case is not of much value in clearing up the mooted problems regarding motor, sensory and stereognostic localization, as the tumor was of such size and so located as to involve both the motor and the postparietal regions. Astereognosis, ataxia and paresis were all present, as shown by a careful study of the case, but as the separate regions of stereognostic perception, the so-called muscular sense and the representation of movements were all involved, no conclusive inferences can be drawn. Astereognosis, ataxia and paralysis, while well marked, were partial, which is probably to be accounted for by the fact that, although the lesion was a large one, it was not subcortical and produced its effects by compression and gradual destruction of the tissues compressed. A point of physiological interest in connection with the study of the case is the entire absence of impairment of cutaneous sensibility, although the postparietal region was distinctly involved. This may be accounted for either on the theory held by some that the limbic lobe is the sole cortical seat of the representation of cutaneous sensibility, or that a lesion must be, in part at least, subcortical in order to cause persisting cutaneous anesthesia, or, finally, that the lesion must be bilateral in the postparietal region in order to bring about its effect.

I believe that we are getting on surer ground with regard both to the diagnosis and the operative treatment of cases of tumor of the brain. In addition to our increased knowledge regarding the localization of cerebral functions, this and the former case reported by me, as well as the case of Church, show that the Roentgen ray method has a practical place in the diagnosis of intracranial neoplasms. I am satisfied, as I have said in previous papers, that the gravest dangers to life in operations for brain tumors are from hemorrhage and prolonged operation. Lack of success in removing tumors is also due largely to the fact that the operations are rarely performed at as early a date as they should be and that the trephine openings are usually too small. I conclude, therefore, (1) that, as soon as a brain tumor is clearly diagnosticated, if presumably it is in an accessible area, operation should at once be performed; (2) that a Roentgen ray investigation should be added to the other methods of making a diagnosis; (3) that large openings in the skull should always be made; (4) that the operation should be osteoplastic in order not to leave a permanent opening in the skull and to add to the chances of maintaining the vitality of the bone flap; (5) that preparation should always be made to perform a Crile operation for temporary clamping of the carotids as soon as hemorrhage becomes threatening and (6) that the operation in some cases should be done in two stages, the propriety of this procedure being determined by the circumstances attending the first operation.—Philadelphia Medical Journal of Sept. 27.

Comments.—A skiagraph of the skull showed a dark shadow, the center of which corresponded to a point just in front of the central fissure. The history of the case is very complete, but the technique of the X-ray work was not given. For a report of a similar

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case, in which the recovery of the patient was rapid, we refer to the article on the first page of this journal. The X-ray operator needs the technique of the method of clinically localizing a tumor as well as technique of the X-ray work.

EARLY DIAGNOSIS OF TUBERCULOSIS.

In an editorial the Medical News of Feb. 8 recognizes the importance of the X-ray as a diagnostic agent in the early stages of the disease. Their value consists not so much in showing the actual location of an area of beginning consolidation as by demonstrating that there is a limitation of the excursion of that part of the diaphragm corresponding to the diseased lung. The fluoroscope reveals this phenomenon very plainly. Careful percussion at the base of the lungs in full inspiration and full expiration will show not infrequently a difference in the descent of the diaphragm on one side. Dr. Loomis called attention to a method of exposing the root of the lungs by auscultation, by placing the palm of the patient on the opposite shoulder. The scapula moves outward and the breath sounds in the bronchi at the root of the lungs can be studied better than anywhere else. The prolongation and roughening of expiration over this area is perhaps the earliest significant sign in pulmonary tuberculosis.

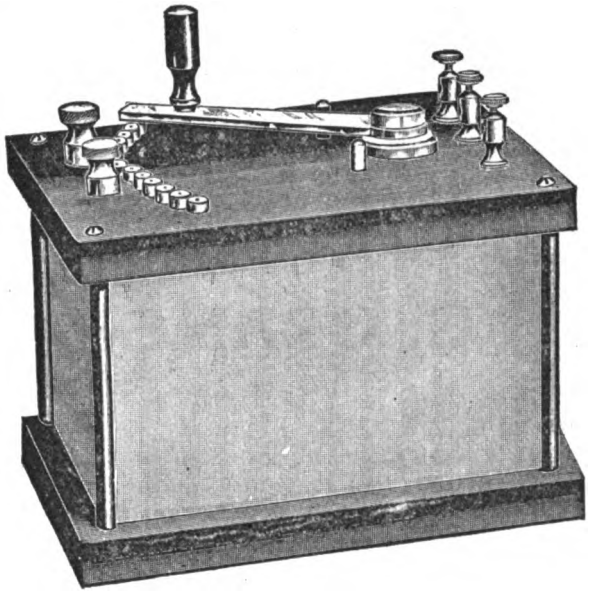
The use of tuberculin is generally considered unjustifiable. The systemic symptoms are of greatest importance, such as undue rapidity of pulse, rise of temperature and loss of weight.

Treatment.—Diet and appetite are to be regulated. The patient must be kept out of doors. All efforts must be made to arouse the reactive vitality of the system.

Comments.—We are glad for this recognition of the value of the fluoroscopic examination, but we believe, however, that even small areas of consolidation may be revealed. Our readers will remember, too, an article in the April issue of our journal in which the technique of Dr. Stubbert of the Loomis Sanitorium is described.

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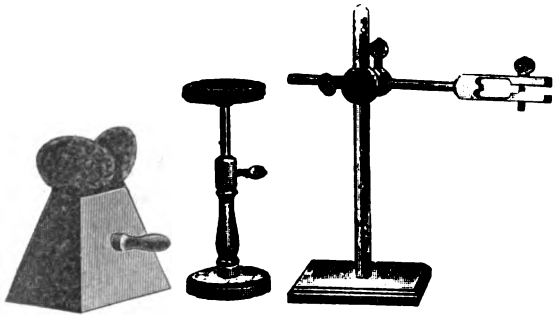


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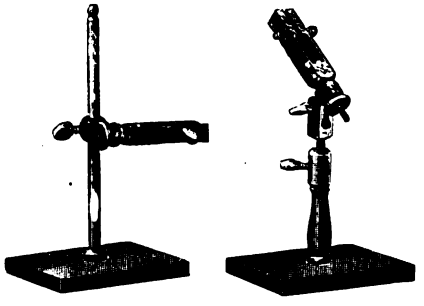
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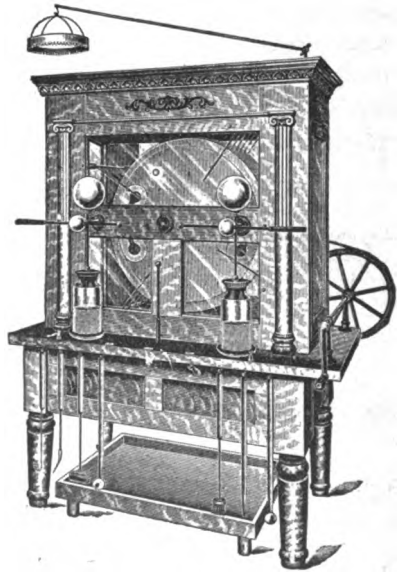
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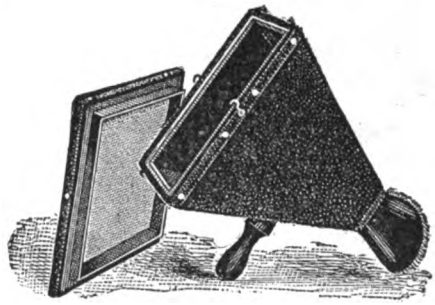
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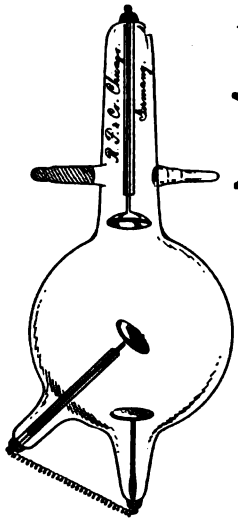
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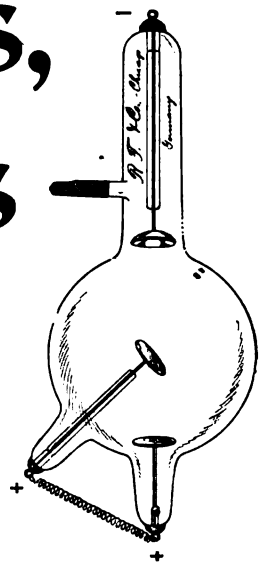
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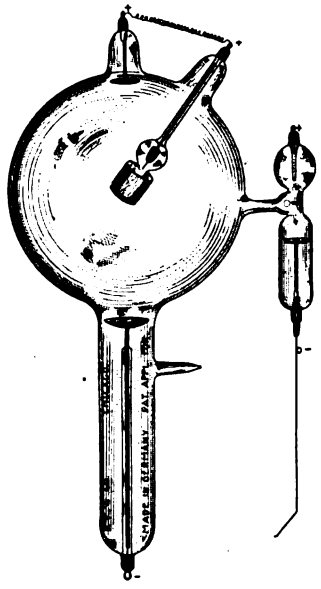
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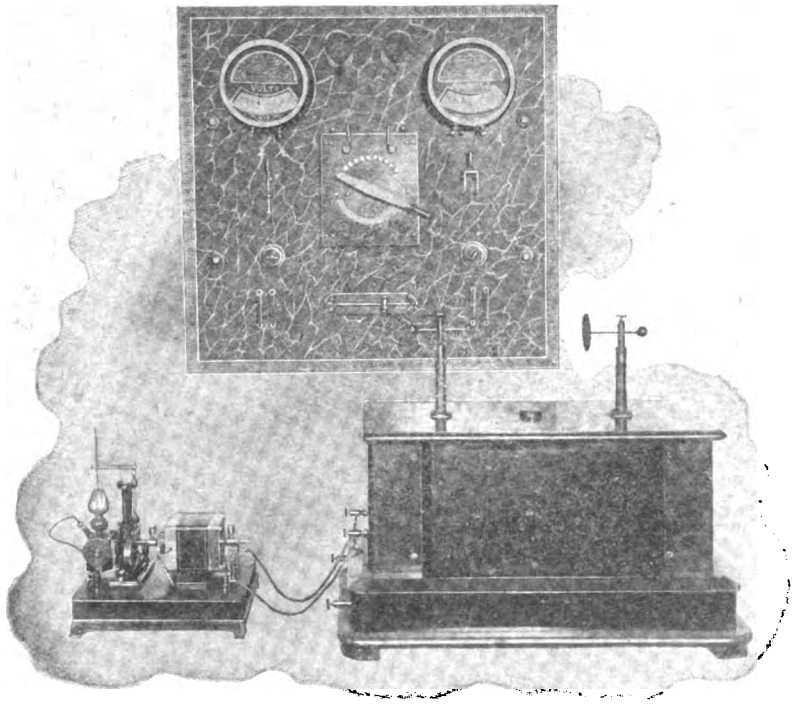
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AMERICAN
Electro-Therapeutic and X-Ray Era

A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, NOVEMBER, 1902. No. 11.

ORIGINAL CONTRIBUTIONS.

KELOID TREATED BY THE X-RAY.

By William Allen Pusey, M. D.

"Boy, age 10 years, referred to me by Prof. D. A. K. Steele of the University of Illinois. The patient had a keloid form in his vaccination scar and another keloid form upon a scar on the helix of his right ear. These were removed and promptly recurred. The keloid on the arm was a typical keloid, as will be seen in the accompanying photograph (Fig. 1.) It was 2½ inches long, ¾ inch broad and ½ inch high. Each of the stitch scars showed a keloid about the size of a marrowfat pea. The keloid on the ear was a curious looking globular tumor an inch in diameter, purplish in color, with dilated blood vessels coursing over it and had grown rapidly. It bore in appearance a resemblance to a sarcoma.



Fig. 1.

"The keloid on the arm was put under x-ray exposures in December, 1900, and proved entirely rebellious to daily sittings for a long time. It was not until after eighty sittings that any effect was produced. Then I carried the treatment to the point of producing a very acute dermatitis, which was followed by the formation of a superficial necrotic membrane. This healed over in three weeks, and after that time (September, 1901) the keloid rapidly shrank. It had practically disappeared by the 1st of November, 1901. The condition since that time is shown in Fig. 2. The entire keloid has disappeared except for a slight ridge down the center of the scar. I think that this has perhaps increased slightly since the exposures were omitted in November, so that I do not believe a successful result can yet be claimed.

"It was interesting to note the sharp limitation to the keloid of the acute inflammatory process produced by the x-rays. There was erythema in the exposed normal skin surrounding it, but this disappeared much more rapidly than the inflammatory process in the keloid. The disappearance of this keloid was due to absorption and not to necrosis. The only ulceration that appeared was the superficial membrane not thicker than parchment, but a mass of tissue disappeared about ½ inch in thickness.

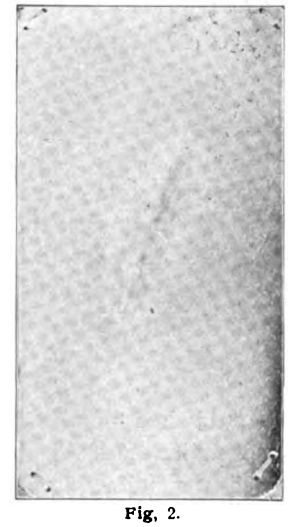


Fig. 2.

"In July, 1901, the treatment was applied to the tumor over the ear and after sixteen sittings (August 10) was carried to the point of producing dermatitis. After the development of the dermatitis there was a very perceptible shrinking in the size of the tumor. The treatment was neglected by the patient until December, 1901, and since that time has been taken up in a desultory way. The growth has decreased very decidedly since the treatments were renewed, but there is still a tumor left about half the original size.

"Keloids are scar tissue of such marked vitality that it would be expected *a priori* that they would not be

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affected by x-rays except by producing a reaction that would destroy any healthy tissue. And yet this keloid was certainly made to disappear without necrosis and

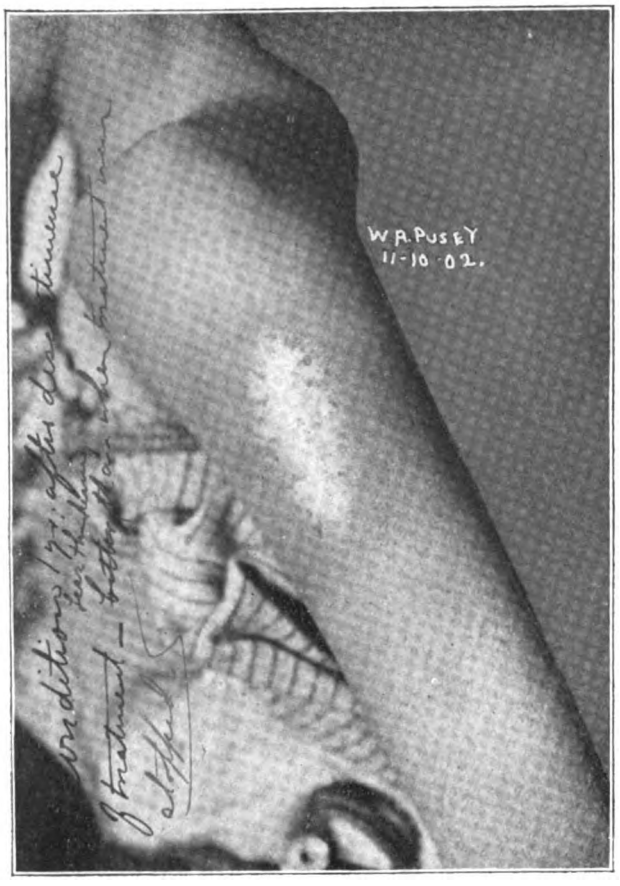


Fig. 3.

without affecting the normal connective tissue. It was found in my first case of lupus that there was a great thinning and softening of the scar tissue in the neck, and this observation is a confirmation of that of other workers. There seems, therefore, to be some reason to hope that the method may be of use in attacking scars."

This case was published in the Journal of the American Medical Association of April 12.

We have obtained the following notes from Dr. Pusey on the subsequent history of the case. He also let us have the photograph of the arm. (Fig. 3.)

The boy has not been treated since April 12, but the arm is much improved. The scar is still better. The skin is soft and smooth; no keloid is left. The keloid on the ear has shrunk to half the size. The treatment has now been resumed. The general health of the patient has been at no time affected by the growth.

STEREOSCOPIC RADIOGRAPHS.

W. C. FUCHS, SCHILLER BUILDING.

With half tone illustrations.

The photographs accompanying these articles were of a girl 10 years old. She was a patient operated on by Dr. Adolf Lorenz of Vienna in the Mercy Hospital. The radiographs were taken before the reduction of the dislocation. The head of the left femur is shown displaced from the acetabulum.

If the two pictures are cut out and pasted on a card board they can be mounted in a stereoscope. A single picture will be produced having thickness; that is to say, instead of all the shadows being in a flat plane, the bones will stand out from the paper. Thus the thickness of the region radiographed is given in the picture produced by the stereoscope.

Another interesting fact is that if the two radiographs be reversed in the stereoscope, namely the one on the right be placed on the left and vice versa, the position of the view is reversed. That is, if in the first arrangement of the radiograph in the stereoscope the observer seems to be looking at the pelvis from in front, then by the second arrangement he will seem to view the pelvis from behind.

The stereoscopic effect is obtained in the following manner: the patient is placed on his stomach. The tube is placed so that the anode is two inches from the median point of the line joining the heads of the femur. The median point is determined by a plumb line and the location of the anode is carefully made. The axis of the tube is parallel to the axis of the spine. The axis of the tube is rotated so that the central cone of rays passes through the dislocated femur. A radiograph is then taken. The tube is then moved two inches to the left of the median point of the line above mentioned. The tube is placed at a corresponding position on the right. A second picture is then taken.

In the plates taken, the distance was thirteen and one-half inches between plate and anode. The length of exposure for each position was about two and one-half minutes. I use a coil with rotary interrupter. The tube was medium vacuum. The plates were developed in the same tray. This is essential because the two plates must have an equal density. It goes without saying that the tube must work at the same vacuum and at an equal intensity, otherwise the pictures will be of different density.

The two plates thus formed seem identical, but are not so because they are taken from a slightly different angle. The negatives are then placed in a Wheatstone stereoscope. The image produced is similiar to what would be seen with direct vision if the soft tissues were transparent. The value of the method is therefore evident. A foreign body would be located exactly in reference to the bones. A similar exactness would be attained in the location of bony fragments. A little more care is required, perhaps, to take stereoscopic than ordinary radiographs, but the care is well repaid.

X-RAY TREATMENT OF EPITHELIOMA.

A report of a few cases treated by x-ray may be of interest to the readers of this journal.

MRS. W.—Patient, aged 68, came to me for x-ray treatment of a growth on the forehead. This growth

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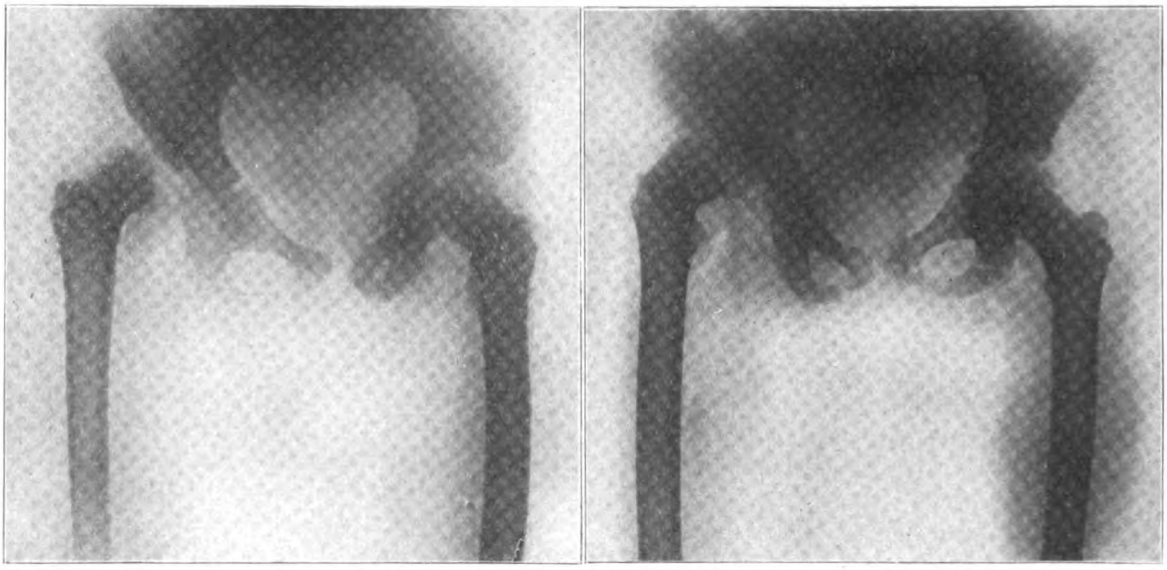
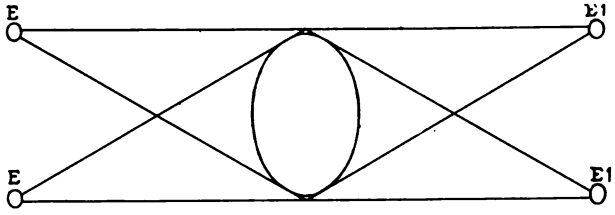


FIG. 1 FIG. 2.

STEREOSCOPIC RADIOGRAPH

TO ARTICLE BY W. C. FUCHS

TAKEN FOR DR. ADOLPH LORENZ, OF VIENNA



The large oval is the image of the pelvis seen in the stereoscope with the cuts arranged, Fig. 1 and 2, and the two circles E are the eyes viewing from in front. The two circles E' are the eyes looking from the posterior view produced by interchanging of the two radiographs.

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had existed for a period of eighteen years and had been diagnosed as epithelioma by several competent physicians. It had increased gradually in size until at the time the patient came under treatment it measured about two and one-half inches in length and two inches in width.

It would bleed at times quite profusely, from the slightest irritation.

This surface had been subjected to a variety of treatments, surgical, electrical and medicinal, with negative results.

Treatments were commenced June 18th and continued daily almost uninterruptedly for two months, with fifteen minute exposures, the tube being placed about eight inches from the affected area and the face being protected in the usual manner by a mask of x-ray foil.

Improvement being very marked, the daily treatments were abandoned and x-ray exposures were made about twice a week for several weeks. The patient was discharged, apparently cured, Sept. 20th, with no trace of the disease remaining.

The underlying tissues present a healthy appearance.

This case was treated with a medium vacuum tube excited by a 16-plate static machine.

No x-ray burns were produced during the entire course of treatment.

CASE No. 2.—Mrs. S.—Aged 65, came to me Sept. 16, 1902, for the treatment of a growth presenting the characteristic appearance of an epithelioma, extending for a space of an inch and a half along the upper border of the upper lip. This condition had existed for about two years and at the time the case came under my care was greatly aggravated, having been violently struck in the diseased area a few days before.

TREATMENT.—Treatment was commenced on Sept. 16th and administered daily for fifteen minutes. The patient was discharged apparently cured on Oct. 25th, no trace of the disease remaining.

A slight burn was manifest about the end of the second week of treatment, but the exposures were continued and the improvement was very rapid after the dermatitis was produced. This patient was instructed to return from time to time for treatment.

The technique employed was the same as in Case No. 1.

CASE No. 3.—Mrs. H.—Aged 90, came under treatment for an epithelioma which involved over three-fourths of the external surface of the nose. This condition had existed for more than a year, growing slowly until within a month of the time it came under my care, when it sprung into sudden activity and developed with alarming rapidity.

Treatments were commenced on July 10th and the patient, although of extreme age, came to the office daily until Sept. 4th, when treatments were suspended for a few days on account of an x-ray burn. This healed rapidly and pronounced improvement in the condition followed. Daily treatments were suspended and treatments administered twice a week.

The patient is still under treatment and at the present time a small wart-like projection about the size of a small pea is all that is left to mark the site of the original growth. The disease was extending rapidly toward the eyes, and the delight of this aged patient at the removal of that which would eventually cause her to lose what is most precious, her eyesight, is one of the gratifying features in the production of relief from this dread affliction.

The technique employed was the same as in Case No. 1. In Cases 2 and 3 when the burns were the most pronounced I made use of a piece of celluloid screen and found that by passing the rays through this substance treatments could be continued daily without any bad results.

DR. NELLIE BELL,
Fremont, Nebraska.

Comments.—We are glad to have reports of such a nature where the technique is so clearly explained. It is interesting to note the rapidity of the improvement after the dermatitis had developed. This report helps to establish the technique of the treatment in superficial cancer and agrees with the work of other operators.

CHRONIC ULCERATION OF THE LEG TREATED WITH X-RAY AND BRUSH DISCHARGE.

BY W. L. HEEVE, M. D., BROOKLYN, N. Y.

Electrotheraphy is gradually finding its way toward the head of the list of specialties. The errors and vagaries attributed to this method of cure were probably the result of a lack of knowledge on the part of the operator. Too few physicians appreciate the importance of this method. My success in the treatment of cancer with the x-rays has been an incentive to me to experiment with this apparently new form in this most troublesome condition of ulceration.

Owing to the perverted surface nutrition which generally accompanies these ulcers, e. g., in connection with varicose veins of the leg, it is impossible by the old method of treatment in the majority of cases, to stimulate the process of repair, and in a few cases in which we are able to produce healing the new tissue has poor resisting powers.

Having noticed the active circulation and, therefore, the good nutritional reaction which occurs in the new tissue formed when superficial cancers are cured with the x-rays, I was stimulated to try the same treatment for ulcers of the leg. We can encourage our patients to accept the treatment, as it is painless and it will immediately relieve the persistent itching which generally accompanies ulceration. The sphere of usefulness of this wonderful form of electric energy is becoming greater every day. The static machine being endowed with high electromotive force

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and low amperage, capable of exciting a Crooke's tube most admirably, has placed within our hands a machine possessing powerful therapeutic properties.

Generally patients suffering with ulcers of the leg have run the gauntlet of quack medication, administered by unscrupulous pharmacists or some old friends who have cured "hundreds" with their favorite recipe (consisting of tar, pitch, dog-fat, horse-oil, or other rancid combinations).

When the patient presents himself to his physician for treatment the ulcer is of the indolent variety, the edges indurated, the surrounding parts edematous with perverted surface nutrition and a localized, irritable itching eczematous condition.

Method of Treatment.—After thoroughly cleansing the ulcer and surrounding parts with green soap and saline solution, getting rid of all loose shreds of broken-down tissue and then thoroughly drying, the ulcer is in condition to be "rayed." The healthy skin should be protected by covering of sheet lead which has an opening directly over the ulcer, allowing its complete exposure, with a marginal area of about ¼ inches. The patient should assume a horizontal position upon an examining chair. The tube should be placed at a distance of about eight inches, and in such a position that the platinum anode plate is in the proper obliquity to reflect the rays upon the ulcer. The tube should be of medium vacuum and actuated strongly. The duration of the exposure should be of about ten to fifteen minutes. Between the first and second exposure at least seven days should elapse, and between the second and third five days, giving ample time to watch for the idiosyncrasies which some patients have toward the x-rays. After the fourth exposure—which should never be given before the fifteenth day, the part should be "rayed" every third day until healthy granulation tissue begins to form at the base. When this occurs I begin treatment with the "brush discharge" from a static machine.

The "brush discharge" must be applied over the ulcer and the surrounding part. If varicose veins are the exciting cause, then apply it along the entire leg and thigh, especially along the course of the veins, and lastly over the ulcer. Each treatment with the "brush discharge" must be twenty minutes in duration to obtain results, and the interval between each treatment should not exceed forty-eight hours.

During the last few months I have been using an electrode made of soft wood and having a test-tube covering the terminal; this will effect the same results as the patented vacuum electrodes. The electrode should be about twenty-eight inches in length, and the terminal should fit tightly into the test-tube, expelling all the air. The test-tube will act better if the inner surface is "silvered." In using the "brush discharge" the indirect method should be employed, the electrode being attached by a chain to the gaspipe and held at the extreme end of the handle. This will give a powerful discharge, but not painful. The result will be improved circulation, increased nutrition, reduction of the edema, and a rapidly healing ulcer.

With the above method a cure is established. In varicose ulcers it produces rapid healing, overcomes the localized eczema surrounding the ulcer, increases the circulation, thereby overcoming the blood stagnation and producing an astringent effect upon the smaller veins.

In some cases I have found that when the ulcer is healing and the serous or lymph edema is disappearing, intense pain is felt during the night. This, I believe, is due to pressure of the deep-seated enlarged veins (comites), but it is immediately relieved by the use of the sponge electrode (galvanic) over the painful area and the negative on the gluteal region of the same side, giving about fifteen ma. current of five to ten minutes' duration.

With the treatment mentioned I have cured twenty-four cases of chronic ulceration; two due to traumatic causes were neglected and passed into the chronic stage; three due to traumatic causes, owing to old age of the patients, resisted all medical treatment, and nineteen were due to varicose veins. Recurrence happened in one case of varicose ulceration, but it was immediately controlled and repaired by seven treatments of the "brush discharge." One case of varicose ulcer is worthy of reporting in full:

Mrs. M., aged 45; weight, 192 pounds. After the birth of her last child, two years ago, she complained of pains in the left leg; gradually the superficial veins became varicose and lymph edema developed. Complete excision of the internal saphena from the knee down was performed, giving relief for a period of five years, with recurrence of the symptoms six years after the operation. By wearing an elastic stocking and with external and internal treatment she obtained temporary relief. During November of last year (1901), upon examination, the following condition was found: Large ulcer, measuring two and one-half inches in diameter, indurated edges and a surrounding area of edematous infiltration with purplish discoloration. All the usual methods were tried without success. January 29, 1902, the part was rayed ten minutes with a medium vacuum tube, actuated by a static machine. After five exposures to the x-rays granulations commenced, and then static brush discharge treatment was given. She received twenty treatments, one every other day, of the "brush discharge." Upon examination, April 3, 1902, the ulcer was entirely healed, very little discoloration of the surrounding part remaining; edema was entirely overcome, and she was able to walk two miles without difficulty. On further examination of this patient May 22, 1902, the part presented a few small spots of bluish discoloration, giving no symptom of discomfort,

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and from all appearances a good result has been obtained, more than was ever expected.

Comment: The above letter, typewritten, was sent to us by Dr. Heeve, and we acknowledge the interest attached to the work. A similar letter was published in the American Medicine of Oct. 8, 1902. Because of its special interest to x-ray therapists we are glad that Dr. Heeve sent the letter to us as well as to a standard medical Journal.

We look for further reports of such cases. Every operator having success should make careful note of the progress of his cases. It is only by such careful work that the value of the treatment in ulcers can be established. It must not be supposed that the x-ray will be as successful in all kinds of ulcer as in the ulcerated epitheliomas (rodent ulcer) and in ulcerating carcinomas. In the former lesion success is most marked. We must dissent from the author's view regarding the possibility of forcing the air out of the test tube by fitting it tightly over a piece of wood. He may have had good results, but we are inclined to think that a small 50c geissler tube would have given a better effect.

THE CURATIVE EFFECT OF THE X-RAYS ON CALLOUS SINUSES OF THE ABDOMINAL WALL.

D. Berry Hart, M. D., Gynaecologist to the Royal Infirmary, Edinburgh, etc.

"Persistent sinuses of the abdominal wall, where no foreign body is present, are a great annoyance both to the operator and patient. In two cases I have found these heal with marvelous rapidity after a few exposures to the X-rays, and thus think the experience worth recording for further trial. The fact of this action was stumbled on by accident, as follows:

"A patient, Mrs. S., was sent me from Singapore by Dr. Leask with a persistent sinus in the abdominal wall, after an incision in the right iliac fossa to evacuate bloody fluid of unknown origin. This sinus was five to six inches long, and ran from near the anterior iliac spine downward and inward to the uterus. It had existed for several months. In order, if possible, to see how it ran, I asked Dr. Dawson Turner of the Edinburgh Infirmary Electrical Department to take an X-ray photograph (a probe being placed in the sinus and one in the uterus). This did not help one much topographically, as to the sinus, but I was struck with the almost magical cicatrization of the sinus after plugging with iodoform gauze for several weeks had failed.

"In a second case of more marked sinus persisting for some months; operations for extraperitoneal gestation where fetal bones had been retained for five years the patient was sent out well, but with a narrow sinus into the shrunk sac. This did not heal as I had hoped, and the patient was again sent into Ward xxxvi with a sinus admitting the index finger. In my absence Dr. Milne Murray ordered the application of the X-rays, and a cure was effected after three exposures. I have since learned indirectly that this sinus has reopened a little. It is possible there may be some bone present.

"It seems to me advisable, therefore, to record these two cases, so that a further trial may be given to a form of treatment now available in most large hospitals."—British Medical Journal, May 31, 1902.

Comments.—We print this in full, an abstract of which we first saw in the Journal of Advanced Therapeutics. As the treatment has been so successful in healing ulcerating epitheliomas, it might well be tried on chronic abscesses that will not respond to the common remedies.

THE ROENTGEN RAY A DIAGNOSTIC AGENT IN PULMONARY TUBERCULOSIS.

Although we are always glad to publish articles favorable to the X-rays, we are bound to give our readers views from any reliable source. The following paragraph occurs in an article contributed by Silvio von Ruck, M. D., of Ashville, N. C., for the September issue of the Buffalo Medical Journal:

"The Roentgen ray has numerous advocates as a diagnostic aid, but its natural limitations must exclude it as affording no information in the period of the first eruption of tubercles. Not until the pathologic changes have advanced to such a degree that areas of considerable consolidation are present can we expect to obtain shadows which can in any way be characteristic. Again, as regards anomaly in the comparative range of movement of the two sides of the diaphragm, which has often been observed in phthisis, since this is due to structural alterations in the affected lung, we certainly cannot afford to wait, if we hope to make an early diagnosis, until such changes have taken place. We might with just as much reason delay in our diagnosis until the advent of the tubercle bacillus in the sputum, and we know that until destructive changes are occurring with softening, liquefaction and evacuation of caseous foci, the appearance of the germ in the expectoration is a manifest impossibility. Besides, an X-ray outfit is an expensive apparatus which but a comparatively few practitioners are able or willing to afford, and whose practical employment entails considerable experience to obtain anything like reliable results as a means of diagnosticating even early phthisis."

The paper of Dr. Kassabian, in a previous issue of our Journal, is more favorable to the rays and his cases seem to prove his point. Dr. von Ruck prefers the evidence presented by the well-known means of diagnosis and says that the tuberculin diagnosis when properly applied is perfectly safe and free from undesirable defects.

The meeting of the American Roentgen Ray Society promises to be one of great interest.

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Editorial Management. The "Era" will be edited by Prof. C. H. Treadwell, formerly instructor in Physics in Syracuse University; besides a corps of eminent medical practitioners, and more especially those engaged in Electro-Therapeutics, will be prominent contributors.

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NOTICE.

The next meeting of the reorganized Chicago Electro-Medical Society will take place Nov. 25th, 8 p. m., at Room 301, Schiller Building.

Papers read at the meetings of the American Roentgen Ray society are always of great interest. They will be especially so in this December meeting because of the great progress made in the last year. Another interesting feature will be an exhibit of the apparatus of prominent manufacturers. Do not fail to attend this meeting. It will be held December 10th at the Sherman House.

MEETING OF THE ROENTGEN RAY SOCIETY OF AMERICA.

This meeting, held in Chicago Dec. 10 and 11, will be one of great interest to all x-ray operators and should be largely attended. It will bring together the men who have done so much in one year, not only to perfect the radiograph, but also to demonstrate beyond doubt the value of x-rays for therapeutic purposes. It must not be understood that the successful radiograph could not be taken before, nor that the x-rays had not been used in the treatment of lupus and external cancer; but rather, that the entire subject has now been brought to a firm basis. Much remains to be done. Something of value ought to result from the interchange of views and experience.

We shall be glad to have all who attend the meeting feel free to call upon us at any time. We would take pleasure in securing hotel accommodation for any who are strangers in the city. The Era is personally interested in all work done by x-ray operators. We believe that excellent results are being obtained by many who have not published their work. We therefore hope our readers will come to our office when in the city and let us become acquainted with them.

SECRETARY'S REPORT OF THE CHICAGO ELECTRO-MEDICAL SOCIETY.

The first meeting of the Chicago Electro-Medical Society since the granting of the charter was held in the Schiller Building on Tuesday, Oct. 28, 1902. Dr. Burdick was made temporary chairman and Mr. Treadwell temporary secretary.

Dr. Burdick briefly reviewed the history of the old society and gave the causes that led to the formations of a new society and the procuring of a charter. The charter gives the name of four directors and these can elect others as members of the society. Dr. Burdick asked for an expression of opinion whether the society retain the old name.

Dr. Neiswanger favored keeping it. Dr. Burdick remarked that practically all who wrote articles were in favor of disbanding the old society.

Dr. Cottrell, in order to get an expression from those present, moved that the new society keep the name of the charter. Carried unanimously.

Dr. Burdick stated that by-laws were needed, the general constitution being contained in the charter.

A list of names was presented for admission to the society. It was moved and carried that the board of directors act upon the names and notify those elected to appear at a special business meeting to be held one week later.

An address was then given by Dr. Neiswanger on the value of special education in electro-therapeutics.

The discussion was participated in by Drs. Cottrell, Grubbe, Marsh and Burdick.

Motion was made and carried that a meeting be held on Tuesday, Nov. 4, for permanent organization.

Society then adjourned.

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ADDRESS AND DISCUSSION ON THE VALUE OF SPECIAL EDUCATION IN ELECTRO-THERAPEUTICS.

Before the Reorganized Chicago Electro-Medical Society.

Dr. Neiswanger's address was as follows:

He outlined briefly the history of electricity. He then showed that the laws of electricity must be experimentally proved in the physics laboratory. It is only thus that the student gets a practical acquaintance with the phenomena of electricity in its various forms. He had often received letters from physicians that revealed their ignorance of the laws governing electricity. One physician wanted to treat a traumatic stricture of the œsophagus with only one electrode from the galvanic battery, thus leaving an open circuit. Another had a "home battery"—a faradic-magneto-machine, consisting of two spools to be revolved in front of a horseshoe magnet. He said this seemed to be too strong to remove hair and wanted to know how to make it weaker. Another wrote he wanted a battery to control horses in a field—a letter full of perplexities because of its vagueness. Dr. Neiswanger took it to mean that it was desired to send a current along a wire fence to give the horses a light shock should they try to break through the fence. Another writer asked if his $7 battery couldn't be made to light his house.

DISCUSSION.

Dr. Cottrell approved the paper and deplored the ignorance of the average practitioner in electro-therapy.

Dr. Grubbe stated he had received letters somewhat similar to those cited by Dr. Neiswanger. The ignorance on the subject so common 100 years ago is now inexcusable. Physicians consider the use of electricity simple. The manufacturers are to a large extent responsible for this, because they do not enumerate any of the difficulties. It would be of value to many practitioners if a galvanic battery company would publish a simple description of their apparatus. Much more would be the value in the x-ray field. At present physicians buy x-ray outfits and use the rays in reckless fashion. A letter from one physician said he had seen that the x-ray had caused the hair to grow on a bald head; he had tried it on his own head and had practically lost the few hairs he had. He wanted to know whether he would regain his head of hair.

A physician, when in his laboratory, remarked that Dr. Grubbe's x-ray tube had a different color from his, which was blue while Dr. Grubbe's was green. The physician had evidently been operating a punctured tube. Dr. Grubbe condemned the institutions that announce courses given in electricity for nurses, some of these advertising mail courses of one week. Physicians wouldn't dare to give such a simple thing as the knife to the nurse and yet the application of electricity is far more difficult and when improperly applied is almost as disastrous.

Dr. Burdick said that one very important fact had been overlooked. The physician who wishes to become posted on electricity buys a medical treatise on the subject, but finds it full of the most perplexing and unimportant details. Men run into print who are not at all fitted to make an exposition of the subject. Nothing is so puzzling as this unnecessary padding. Even the journals can be criticised from this standpoint.

The easiest way to get a thorough knowledge of the physics of electricity is to read up the subject in such works as Dolbear's or Thompson's "Lessons in Elementary Electricity."

The time of the old office is past. The patient who sees an outlay of capital in the physician's office will be willing to pay more for the treatment. An electrical equipment is therefore of great financial assistance, even in country practice.

Electricity should make constant progress. At the time of DuBois Raymond great progress was made, but little new was achieved after him until the discovery of the x-ray. This made a demand for better apparatus and the entire science has profited.

A certain branch offers a wide field for research: Therapeutic work in the high frequency current. Very little has been done in the West. Any physician can make a high frequency solenoid and use it in connection with either a static machine or coil. Too many have used these on any case happening in, employing the high frequency current on the supposition that it can't do any harm and may do some good. Such work brings lack of confidence because of inevitable failures.

X-RAY THERAPY.

The clinical data which are rapidly accumulating will soon place the X-ray as a therapeutic agent in a position where it can be used safely and effectually. The report to which Dr. Speier refers in this number presents one danger which can be avoided by care in the future. At the meeting of the American Electro-Therapeutic Association at Catskill mountains, N. Y., Sept. 2 to 4, X-ray therapy was the leading subject of discussion. It was generally agreed that superficial malignant growths and lupus can certainly be cured by it. There is yet considerable difference of opinion regarding internal growths, although cures were reported of cancers of the uterus, rectum and larynx. In advanced cases which will prove fatal the X-ray relieves the pain, removes the odor and diminishes the discharge. Cures by the X-ray were reported of tubular glands in the neck, sarcoma, antrum disease, carbuncles, nevi, chronic inflammatory processes, fibroids and pustular acne. The transactions of this meeting will be very useful to physicians practicing electro-therapy. It is to be hoped that the association will at once publish this report and place it on sale to the whole profession. To be of especial value it should be issued promptly.—Wisconsin Medical Recorder.

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BUSINESS MEETING.

The business meeting of the Chicago Electro-Medical Society was held in the Schiller Building, on Tuesday, Nov. 4th, with Dr. Burdick in the chair. It was moved and seconded that the question of associate members be left open until the society decide upon the necessary qualifications and the manner of affiliation of such members. The following members were reported elected by the directors:

E. Stillman Bailey, M. D., 31 Washington street.
Stewart Johnstone, M. D., 34 Washington street.
Ernest L. Hayford, M. D., 34 Washington street.
David Cottrell, M. D., 264 E. Chicago avenue.
A. H. Andrews, M. D., 100 State street.
Noble M. Eberhart, M. D., 100 State street.
Frank M. Kindig, M. D., 2136 Indiana avenue.
Mae C. Rice, M. D., 6955 Perry avenue.
J. C. Brubaker, M. D., 1012 E. Garfield boulevard.
C. S. Neiswanger, M. D., 31 Washington street.

The committee was appointed to consist of Dr. Andrews as chairman, Dr. Cottrell and Dr. Grubbe, to draw up by-laws and report at once to the society. The society took a recess until the committee reported.

The committee then reported a set of by-laws.

It was moved and seconded that the by-laws be adopted. Carried.

Moved that the society concur in the present officers specified in the charter. Carried.

Dr. Grubbe was then elected as vice-president.

Moved and seconded that the charter be kept open until after the meeting in December. Carried.

Moved and seconded that the society accept the offer of Mr. Friedlander and adopt his journal, The American Electro Therapeutic and X-Ray Era, as the official organ of the society. Carried.

Moved and seconded that the directors be authorized to provide permanent quarters for the society.

Society then adjourned.

NOTICE.

Attend the meeting of the American Roentgen Ray Society, held in Chicago December 10-11.

INFLUENCE OF THE X-RAY UPON DIFFERENT VARIETIES OF SARCOMA.

To anyone who has followed the literature of the treatment of sarcoma a contribution from William B. Coley is of great interest. In the Twentieth Century Practice of Medicine is described his method of treating sarcomatous growths with injections of the mixed toxins of erysipelas and bacillus prodigiosus. We were much interested to read a statement that Dr. Coley had read a paper before the American Surgical Association in Albany in June. The paper appeared in the American Medicine of August 16. We give in full the history of certain characteristic cases, in others giving only a general resume.

"CASE I.—*Inoperable round-celled lymphosarcoma of neck, pectoral region and axilla.* M. L. A., a lady, 45 years of age, first noticed tumor just above the clavicle about two years ago. This was removed. Shortly after a recurrence was noted in the right cervical region, which grew with great rapidity, very quickly involving the axillary glands on the same side. In July, 1900, the axillary tumor was removed by Dr. C. B. Nancrede, of Ann Arbor, Mich. The tumor in the cervical region showed such extensive involvement of the deeper structures that it was considered entirely inoperable. Microscopic examination was made by Dr. King, professor of pathology of the Dartmouth Medical School, who pronounced it small round-celled sarcoma. The patient was referred to me by Dr. Nancrede for the toxin treatment in October, 1900. Physical examination at this time showed a large tumor in the right cervical region, extending from the clavicle to the mastoid process of the temporal bone. There were some enlarged nodules below the clavicle and several small tumors in the region of the cicatrix in the axilla. The toxins were begun at the General Memorial Hospital, October 1, 1900, and continued with intervals of rest for six months. There was a very decided decrease in the size of the tumors and increase in their mobility. This continued for about three months, and then, in spite of further injections, the improvement ceased. At the end of six months the growths slowly began to increase in size, and it was not thought wise to further continue the injections. Since June, 1901, no treatment further than palliative has been used, and the patient has since then been awaiting with great courage and composure what was regarded as the inevitable and not long to be delayed end. The tumors slowly but steadily increased in size, and at the beginning of February, 1902, her condition was as follows: The tumor masses encircled the entire neck, ending at the vertebral line, and extending from the mastoid process to the clavicle on the left side, on the right side involving the entire cervical, supraclavicular, pectoral and axillary region, about the size of two fists. The constriction of the trachea was so great as to cause frequent and severe attacks of dyspnea. She was confined to the bed the greater part of the time. With little hope of causing even temporary improvement, but more as a matter of experiment, I determined to try the x-ray. The treatment was begun February 10, 1902, four to five exposures per week, at a distance of eight inches, being given. The instrument used was a Willyoung coil, 12-inch. At the end of three weeks a marvelous change had taken place. The tumor masses had decreased fully one-third in size, and had become very movable. A small burn was produced in the upper right cervical region over the most protuberant part of the tumor. The skin in this place had become very thin from the pressure of the disease. The burn healed in two or three weeks. The treatment has been kept up at the

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rate of four exposures a week until the present time, and rapid improvement has continued steadily. Today, June 5, the patient has entirely recovered her general health, and she is able to go out daily walking and driving. The tumor masses on the left side have entirely disappeared, with exception of one or two small nodules not larger than peas. On the right side, on which the tumor mass was nearly as large as two fists, there now remains a nodule not larger than an olive. The masses in the front, over the trachea and extending into the mediastinum, have entirely disappeared, as well as those in the supra and infraclavicular regions. There remains a small nodule in the right axilla, about the size of a hickory nut.

On June 18 the small nodule in the neck was removed under ether for the purpose of making a microscopic examination with a view of finding out what changes had taken place in the structure of the tumor. The nodule was situated just beneath the inner edge of the right sterno-mastoid muscle, near the middle, and was no larger than a small marble (one-half inch in diameter). The specimen was examined by Dr. George P. Biggs, pathologist of the New York Hospital, who stated that it showed the typical structure of round-celled sarcoma. The patient left the hospital entirely well July 8, 1902."

CASE II.—*Sarcoma of the femur involving the lower two-thirds of the bone.* Under x-ray treatment the signs of the tumor steadily decreased, but of late signs of beginning of metastasis in the right lung have developed.

"CASE III.—*Small round-celled sarcoma of the pectoral region.* E. M., aged 35 years; family history good. First noticed a tumor in the right pectoral region, near the anterior axillary line in the latter part of 1898. This grew rapidly in size and was operated upon by Dr. M. H. Richardson in November, 1900. The tumor at this time was the size of a fist. Extensive removal of the mass and part of the muscle was made. Microscopic examination by Dr. W. F. Whitney, pathologist to the General Memorial Hospital, showed it to be a small round-celled sarcoma. The tumor recurred about six months after operation and grew very rapidly. A second operation was performed in October, 1901. The growth then involved the pectoral and axillary region so widely that it was found impossible to remove it. Amputation of the upper extremity was considered, but not thought advisable. The patient was referred to me by Dr. Maurice H. Richardson in December, 1901, for the mixed toxin treatment. The toxins (prepared by Dr. B. H. Buxton, and also by Parke, Davis & Co.) were administered five to six times a week for a period of three months, the doses being gradually increased until a reaction of 102° to 103° was produced. The tumor began to soften and a spontaneous opening occurred in January, 1902, with evacuation of about a pint of necrosed tumor tissue. The growth had thus considerably diminished in size, when on February 10, 1902, I began the x-ray treatment, which was continued for two weeks without any further decrease in the size of the tumor. The toxins and x-ray were then given in combination four times a week, and since this time the growth has steadily and rapidly decreased in size. One week ago he was able to clasp his hands behind his back for the first time in eight months. The mass in the axilla has entirely disappeared, movements of the shoulder which were greatly restricted are practically normal and there now remains only a very small, freely movable mass, not more than two inches in diameter and very superficial in the pectoral region. This disappeared.

"This was believed to be the only induration caused by the toxin injections, and a specimen removed under cocain, June 7, proved—on microscopic examination by Dr. E. K. Dunham, the pathologist of the General Memorial Hospital—this supposition to be correct, and no evidence of malignancy could be found. The patient has remained in good health, and was discharged apparently well June 8, 1902. As an indication of the hopelessness of this case, I will quote from a letter received from Dr. Richardson, under date of May 6, 1902:

" 'I feel so sure that he is going to die that I have told him not to accept any discount on the face of his life insurance policy. In other words, I have not the least confidence in his ultimate cure.'

"Physical examination made June 27, 1902, shows the small area of induration mentioned before, and proved by the microscope to be nonmalignant, to have disappeared. The patient is in the best of health."

CASE IV.—*Round-celled sarcoma of the fascia of the thigh.* Recurrent after two operations. Both the toxins and the x-ray failed to affect the tumor, which was growing rapidly.

CASE V.—*Very rapidly-growing round-celled sarcoma of the parotid; death within six months from date of origin.* The toxins failed to check the growth, as did ligation of the external carotid and x-ray treatment; only five of the latter were given before the patient was too weak to receive them.

CASE VI.—*Recurrent melanotic sarcoma of the iliac glands.* The x-ray treatment of three or four times per week for several months have produced a slight diminution in the size of the tumors, but the patient has been losing weight.

"CASE VII.—*Spindle-celled sarcoma of the upper jaw.* T. N., 46 years of age; married; farmer.

"Family History.—Great-grandfather and grandfather died of cancer of the face. Uncle died of epithelioma of the lip, a cousin of sarcoma of neck. Gonorrhea seven years ago; no syphilis. Teeth always carious and many removed. Typhoid in 1897; pleurisy with effusion in 1892, otherwise always healthy and strong, except for present trouble.

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"About January, 1899, he began to have severe frontal headaches. April 1, 1899, he noticed a smooth, somewhat painful, rapidly increasing swelling of right cheek. In June, 1899, a mass the size of a walnut was removed through the mouth from inner side of antrum. In a few weeks the swelling returned, and in August, 1899, a large part of the superior maxilla was removed. These operations were done at Pittsburg, Pa. In January, 1900, the swelling again returned and increased in size until he came to the Presbyterian Hospital in June, 1900. The swelling was almost painless, the size of an orange and occupied the right side of the face from orbit to floor of mouth. There was no loss of flesh or strength. The patient was operated upon by Dr. McCosh in June, 1900. The right external carotid was first tied and then an incision made. It was found that most of the superior maxilla had been removed in previous operations. More was removed from alveolar process and from malar bone. The tumor had infiltrated into the inner canthus of eye and considerable tissue and bone were removed from there. The skin, which was adherent to the growth, was cut away and the wound closed, after relieving the tension by incisions lower down. According to the pathologic report, the disease was spindle-celled sarcoma, cells being of moderate size with some mitrosis. At the time of the patient's discharge from the hospital there was a small sinus with some purulent discharge. This closed up entirely in two weeks and patient had no further trouble until July, 1901, when he again began to have some uncomfortable sensations at the site of the old tumor. In the beginning of August a recurrence was noticed. This increased in size with moderate rapidity until October 1, when the patient began to use some caustic paste. This caused a more rapid increase in size. The skin over it broke down and there was a free air communication between the wound and the nasal passages and a week later a purulent discharge set in which remained. The mass completely obliterated the right nasal passage projecting into the oral cavity. Two weeks before admission to the hospital, October 5, the patient noticed a small lump just below and to the left of the external occipital protuberance. It has been painless, not tender and he did not think it had grown very much. There has been no loss of flesh and strength at any time. October 19 the patient returned to the hospital with a large inoperable sarcoma at the site of the former operation, involving the whole of the right superior maxillary region and extending into the roof of the mouth and pharynx. The condition was considered inoperable by Dr. McCosh and the patient was referred to me for the toxin treatment. He was admitted to the General Memorial Hospital on October 25, 1901, and treated with the mixed toxins for several months. At the end of the first month's treatment the improvement was very striking. The growth decreased two-thirds in size and the remainder was easily curetted out, leaving a clean base. For a time it seemed probable that entire disappearance would take place, but after two months' treatment the inhibitory action of the toxins seemed to have been lost and the growth slowly began to increase in size. February 10, 1902, the toxins were discontinued and the x-ray treatment was tried for three weeks.

"In this case the x-ray seemed to have little, if any, effect in controlling the pain, which was gradually becoming very severe. Although the tube was placed but a short distance (not more than eight inches) from the tumor and the exposures of considerable duration (10 to 12 minutes) were given, no effect upon the growth of the tumor was noticeable and at the end of three weeks the treatment was discontinued."

"CASE VIII.—*Small round-celled sarcoma of gracilis muscle, four times recurrent.* W. J. P., male, aged 22 years. This patient first noticed a small lump at the inner side of the left thigh one year ago. This increased slowly until July, 1901, at which time it was about the size of a hickory nut. It was then removed by Dr. William T. Bull. A local recurrence followed in September, when a second operation was performed by Dr. Charles Peck, of New York. Shortly after the second operation, at the request of Drs. Bull and Peck, I began the injections of the mixed toxins as a prophylactic. In spite of the treatment, a recurrence followed about six weeks later, this time in the inguinal glands and growing very rapidly. A third operation was performed by Dr. Bull on November 11, 1901. A large mass involving the inguinal glands and extending into the iliac region was removed. It was found impossible, however, to extirpate the entire amount of infected tissue. A few days later I began using fresh bouillon cultures of virulent streptococcus of erysipelas in order to produce an attack of erysipelas. Moderate reactions were obtained, the highest temperature being 103°. After three weeks' treatment with the living cultures the toxins were resumed in doses of 5 to 7 minims. This treatment was kept up for eight weeks, the patient being able to get about most of the time and attend to his business. No recurrence followed until 13 weeks later, when a small nodule, deeply situated, about the size of a hazelnut, appeared at the site of the original operation, at the inner side of the thigh. The x-ray treatment was then begun and has been continued since with exposures of 8 to 15 minutes in length, a German tube with a high vacuum being used. The first month's treatment showed the growth apparently not increasing in size, although it was not perceptibly smaller. At the end of this time small doses of the toxins were given in conjunction with the x-ray treatment. Whether or not influenced by the toxins, it is impossible to say, but, for the first time, the growth showed a decided decrease. After remaining quiescent, neither increasing nor de-

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creasing for about a month, the growth has since the last three weeks again begun to slowly increase in size in spite of the x-ray treatment, which has been given six times a week. On June 3, 1902, under ether, I removed the tumor, the size of a small hen's egg, deeply placed beneath the adductor muscles and beneath the femoral vein, about three inches below the insertion of the adductor tendons. Its deep situation possibly explains the slight action of the x-rays. The report of the microscopic examination by Dr. Geo. P. Biggs, pathologist to the New York Hospital, reads as follows: 'It is very difficult to make comparison between the slides from old and recent operations in this case. In the first place there is but one slide from the older operation and the section on it is rather thick. As to how well it represents the general structure of the whole tumor might be questioned. While there appear to be some differences in structure, I would not make any positive statements on this point and certainly would not ascribe them to the use of the x-ray without confirmation in other cases. Section from the older tumor shows a larger percentage of small cells and less fibrous tissue than the later tumor. There are several giant cells in the later tumor and apparently none in the older. Intercellular substance, partly homogeneous and partly fibrillary, is more abundant in the later tumor. Both are quite vascular and in both there are areas of necrobiosis. Neither is a typical illustration of small round-celled sarcomas, but the older tumor is very properly placed in this class.' The patient remains well August 6, 1902.

"It is worthy of note that the sarcomatous disease left in the inguinal and iliac region at the time of the last operation apparently disappeared under the influence of the living cultures and the toxin treatment, and although the groin has not been subjected to the x-ray treatment, no recurrence has been noted in this region."

CASE IX.—*Small round-celled sarcoma of the back.* Twice operated upon, appearing as a cyst caused by an injury from a fall. Microscopic section proved diagnosis. Treatment by x-ray begun before entire healing of the wound at the second operation. The treatment was three times per week. That part of the tumor remaining after operation entirely disappeared.

CASE X.—*Inoperable sarcoma of the parotid.* Recurrent after two operations; treatments 10 to 12 minutes four times per week, with tube from 6 to 8 inches. Much of tumor sloughed off; the remainder has decreased in size and vascularity.

Four cases on whom the toxins of erysipelas had been tried but without effect:

"CASE I.—*Small round celled sarcoma of the neck six times recurrent* (case of Dr. James E. Fisk). G. F. H., 70 years of age. About 10 years ago a lump was first noticed in the left side of the neck. Nine years ago this was removed at the New York Hospital. The tumor recurred one year later in the scar and grew much larger. The patient has had four subsequent operations within the last seven years. One tumor was removed from the right side of the neck, the others recurring in the region of the cicatrix of the original growth on the left side and behind the ear.

"The pathologic records of the New York Hospital show the following:

"February 21, 1892. G. F. H., aged 60 years, has had a tumor on the left side of the neck posterior to the scalenus anticus muscle for three years and four months. Of slow growth at first, the tumor has increased in size rapidly during the last three months. No glands were involved. Operation February 20, 1892: The specimen is an oval tumor, 7x4½ inches; no capsule; on surface the voluntary muscle fibers are seen invaded by the tumor tissue at several points. Microscopically the tumor is a typical round-celled sarcoma with small amount of fibrous tissue struma, apparently derived from tissues in which the growth originated.

"On May 13, 1901, the patient was referred to me by Dr. E. M. Foote, of the Vanderbilt clinic, as a case of inoperable sarcoma of the neck, for treatment with the erysipelas toxins.

"Physical examination at that time showed a tumor the size of an orange occupying the left mastoid region. The tumor was very vascular and semi-fluctuating. There was glandular involvement behind the jaw on the right side; also a growth the size of a small orange in the front femoral region. There was a hard, freely movable glandular tumor in the right axilla the size of an English walnut. The patient was treated with the mixed toxins of erysipelas and *Bacillus prodigiosus* from May 13 to June 5, during which time 13 injections were given, the highest temperature reached being 102°. On June 5 I tied the external carotid artery on the left side, under ether anesthesia, using chromicized tendon for the ligature. The wound healed by primary union and the patient then left the hospital, but returned July 16 for another course of the toxin treatment and remained until July 27—11 days. At first there was some slight improvement following the injections of the mixed toxins, but later on there seemed to be very little influence from the treatment, if any. The patient seemed to become rather tired of hospital life and was discouraged. He returned home on July 27, the tumor at the time being about the same size as when he entered the hospital, the base occupying the mastoid region and extending down to the neck, pushing the ear forward. It was not attached to the bone, but was absolutely inoperable and, as I believed, hopeless.

"December 22, 1901, the patient was treated by Dr. James E. Fisk, of Brooklyn, with the x-rays. Patient states that for several years he had been trying to find a physician or surgeon to give him the x-ray treatment, but failed, until Dr. Fisk took him in charge,

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offering to give him two weeks of treatment, but holding out very little hope as to the result. A static machine was used and exposures of ten minutes' duration each day were made for two weeks, when the treatment was continued for further two weeks, the exposures being made for 15 minutes. At the end of four weeks' time the exposures were lengthened to 20 minutes. In all the patient had six weeks' treatment. His condition at the time of the beginning of the treatment was as follows: On the left side of the neck, just behind the ear and extending downward, was a large tumor, fully the size of two fists, pushing the ear far forward. There was also in the right axillary region a tumor the size of a goose egg. Almost immediate improvement was noticed after the beginning of the treatment and the mass rapidly diminished in size; at the end of four weeks it had entirely disappeared. The patient states that at the end of three or four weeks he noticed a softening of the tumor in the right axilla, although no exposures were made in any other region except the neck. This softening continued and the tumor gradually disappeared until at present, February 20, 1902, it can scarcely be felt.

"At the x-ray meeting of the Academy of Medicine, March 9, 1902, I showed the patient in perfect health and there was not the slightest suspicion of tumor or induration in the neck. The tumor in the right axilla had also disappeared.

"On June 19, 1902, I made a careful examination of the patient and there is no trace of a recurrence. Since April, 1902, he has had x-ray treatment for nodules in both groins (size of an egg) and they have disappeared from the left groin and nearly disappeared from the right groin.

"This case is certainly one of the most remarkable of its kind yet recorded, showing the beneficial influence of the x-rays upon sarcoma. The repeated recurrences, together with the numerous microscopic examinations at the New York Hospital, confirmed by a recent more careful examination of the old sections by Dr. Geo. P. Biggs, the pathologist, place the diagnosis absolutely beyond a doubt."

CASE II.—*Spindle-celled sarcoma of the abdominal wall.* Recurrent after operation. Toxin treatment brought improvement for a time and then failed. X-ray treatment was then tried and brought improvement temporarily but the patient gradually became worse.

CASE III.—*Recurrent small round-celled sarcoma of the superior maxilla.* Entire bone excised at first operation excepting orbital plate; prompt recurrence. Three secondary operations. Patient then treated with mixed toxins with temporary improvement. Case then referred to Dr. Wm. B. Snow for x-ray treatment. Improvement marked—tumor decreased to one-quarter of its original size. Case still under treatment.

CASE IV.—*Osteosarcoma of the mastoid and temporal region.* S. M., aged 22 years. Four years ago first noticed a tumor just in front of the right ear. This was excised, but was followed by a recurrence a year later. The recurrent growth was treated with caustics without success. The patient was referred to me for the toxin treatment by Dr. —— ——, of Lexington, Ky., in October, 1900. Physical examination at that time showed a tumor involving the mastoid region of the temporal bone, completely surrounding the ear and forming a mass the size of an egg in the parotid region. The growth originated in the bone, was absolutely fixed; the skin over the parotid portion was normal and not adherent. The posterior tumor projected to the level of the ear and the skin was involved and destroyed, being replaced by a series of hard, small, round reddish protuberances, with little tendency to ulceration. The tumor was unquestionably a sarcoma, although no microscopic examination was made. The patient suffered agonizing pain, for which large doses of morphin were required. She had lost much flesh and strength, and her pulse ranged between 110-120. The toxins were given for three months, but her condition was so poor that she was never able to take more than one-fifth to one-third of a drop injected into the tumor. Even these small doses produced some decrease in the size of the growth and slight improvement in her general condition. At the end of three months she returned home and treatment was continued for three months by her family physician. After the treatment was discontinued the tumor slowly began to increase in size, and she returned to New York for further treatment in November, 1901. The tumor had increased considerably in size, the mass behind the ear being the size of a hen's egg, and the mass in front nearly as large, although the skin was normal. It presented the appearance of a uniform, cone-like bulging of the entire side of the head, the external auditory meatus of the ear occupying the apex of the cone. The tumor was extremely sensitive to the touch, and the pain was more severe than the year before, requiring ½ grain of morphin every two hours to give her moderate relief. She was still much emaciated, pulse is weak and rapid (110-120 per minute). Her susceptibility to the toxins was still marked; a dose of not more than ¼ minim would produce a severe chill and temperature of 102°-103° and marked prostration. She was treated with minute doses (1-5 drop) four times a week, for three months, up to the middle of January. While there was apparently no increase in growth, there was no decided decrease, and inasmuch as it was impossible to give her larger doses, I believed it useless to continue the treatment. Having carefully followed the results obtained by the x-ray treatment in epithelioma and a few cases of carcinomatous nodules in the breast, I thought it worth while to try the effects of the x-ray treatment before abandoning the case as hopeless, and accordingly referred the patient to Dr. William J. Morton, on January 25, 1902.

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Since that time she has been treated four times a week by Dr. Morton, with 10 to 12-minute exposures, at a distance of 8-10 inches. The immediate effect of the treatment was a marked influence upon the pain, which ceased almost entirely after three or four treatments, and there has been very little pain since, making it possible for her to nearly discontinue her morphin. The effect upon the tumor was an almost immediate diminution in size, and this has been constant ever since. There has been no breaking down or necrosis, but a steady disappearance by absorption.

"Physical examination on May 18, 1902, showed the tumor to have almost entirely disappeared, at least the protuberant portion; very little difference could be noticed between the two sides of the face and head. The patient has gained some in weight and looks greatly improved in general health.

"June 15.—About a week ago the patient began to have more pain in the cervical region, with slowly increasing swelling and tenderness. Within the last 10 days the patient has lost several pounds in weight and has developed marked weakness and prostration. There has been considerable discharge from the ear, and the cellulitis of the neck has probably been caused by infection from the brokendown tumor tissue. There has been no apparent increase in the size of the tumor, but the patient's general condition is so bad that I do not believe recovery probable.

"On June 22, under ethyl chlorid anesthesia, I incised the neck, evacuating several drams of thick, foul pus. With free irrigation with peroxid the discharge from neck and ear decreased rapidly, and on July 1 the patient's general condition had improved sufficiently to permit removal to her home in the south."

GENERAL DISCUSSION.

"In my collection of 207 personal cases of sarcoma analyzed in the 'Twentieth Century Practice of Medicine,' 1897, Vol. xvii, no less than 16 cases were primary in the neck. I have never yet seen a case of sarcoma of the neck cured by operation, nor have I been able to find an authentic case reported by other surgeons; hence, if in the x-ray we have a means of destroying these growths, or a certain proportion of them, it means a great advance over present methods.

"As regards the action of the x-ray, no one has yet been able to explain just how the x-ray influences malignant tumors. There have been a great many opinions advanced but none is susceptible of proof. Pusey states that his 'sections show that x-rays cause a degeneration of some sort of carcinomatous tissue and a disappearance of this degenerated substance, presumably by absorption. However it occurs, the fact stands that gross embryonic tissues and other tissues of low vitality are made to disappear under the influence of x-rays without destruction of the uninvaded healthy tissue, and such a fact is pregnant with possibilities.'

"Personally, I believe that there are strong reasons for regarding the action of the x-rays upon malignant tumors as new evidence in favor of the microparasitic origin of such tumors. In support of this view I would cite the fact that nearly all lesions in which the x-ray has been used with such beneficial effect are of known or probable microbic origin, *e. g.*, lupus, tuberculous disease of various forms and many varieties of skin disease, including alopecia areata. It will be objected by some that the x-rays are not bactericidal or so to only a slight degree. The answer would be that the action of the x-ray in a test-tube culture of a given germ might be of a very different kind from the action of the same rays in the living body, with the possibility of forming some chemic change in the living tissues that might destroy the organisms or inhibit their growth. With the destruction of the microorganisms, the continued presence of which in the tumor cells are the supposed cause of their proliferation, the neoplasm may undergo fatty degeneration and absorption.

"It is worthy of note that in the two cases in which the tumors (both large, inoperable, round-celled sarcomas) have almost completely disappeared the patients had been treated with the mixed toxins of erysipelas and *B. prodigiosus* for several months. In one case the tumor had diminished at least one-half in size as the result of the toxins, and then showed little improvement from the x-ray alone; and in the other, while the growth was not checked entirely, the toxin treatment had a marked inhibitory action as evidenced by the slower progress of the disease.

"*Proper Limits of the X-ray Treatment.*—The question will naturally arise, In what class of cases should the treatment be employed? We must confess that the method is still in the experimental stage and while in this stage I do not believe it wise to employ it except in inoperable cases or in cases in which serious deformity would result from the operation, *e. g.*, facial cancer or cancer involving the eyelid or nose. There is a possibility that if the present results prove permanent it will supersede operative treatment in very many cases, especially cases in which operation would necessitate the amputation of a limb.

CONCLUSIONS.

"I am conscious that the present series of cases is too small and the time of observation too short to justify one in drawing any dogmatic conclusions as to the permanent therapeutic value of the Roentgen ray in sarcoma. Still I believe we are warranted in stating:

"1. That the results in the cases thus far treated prove that the Roentgen ray has a remarkable inhibitory action upon the growth of all forms of malignant disease and that this is especially true of sarcoma.

"2. That this action in many cases of even far-advanced and inoperable malignant disease may result in the total disappearance of the tumors, often without

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any breaking down of the tissues, the new-growth being apparently absorbed.

"3. Whether the patients have been cured, or the disease has been merely arrested, to reappear at some future date, is a question that time alone can decide.

"4. Recent observations and experiments upon the various forms of carcinoma and sarcoma prove that an agent supposed to be of value only in a very limited class of superficial epitheliomas promises to be of as great or even greater value in practically every variety of cancer.

"5. While at present there is little evidence to show that deep-seated tumors in the abdomen and pelvis can be cured or benefited by the Roentgen ray, there is still some reason to hope that with improved apparatus or with greater knowledge and skill in using the apparatus that we now have, even these cases may be benefited.

"6. The Roentgen ray has a very marked influence upon the pain of nearly all types of malignant tumors, causing entire relief in many cases."

COMMENTS.

All x-ray operators will be pleased to see what a good showing the x-ray treatment has made even where the toxins failed. Dr. Coley uses a medium high tube energized by a 12-inch coil.

A SUBSEQUENT REPORT ON A CASE OF CARCINOMA, DISCHARGED AS HOPELESS AND REPORTED AS A FAILURE.

WILLIAM ALLEN PUSEY, A.M., M.D., CHICAGO.

In a report of cases treated with Roentgen rays, published in The Journal, April 12, 1902, I recorded a case as follows:

CASE 24.—Man, aged 70, referred to me by Dr. William H. Wilder, with extensive carcinoma involving all the structures in and around the orbit of the right eye. The growth had progressed within the cranium when the treatment was begun. The treatment in this case continued two months, with decided amelioration in his condition for awhile, both as regards the appearance of the growth and his pain, but later evidences of rapid intracranial growth appeared and the treatments were discontinued.

Looking back at this case, it is Dr. Wilder's opinion and mine that we should have taken out enough of the bone of the orbit to have laid bare the structure beneath, so that the x-rays could have been thrown directly on the intracranial growth. Dr. Wilder suggested to me that had this been done, there might have been a chance of controlling the disease, so marked was the effect on the diseased tissue which was directly exposed.

When this case came under observation the eye was destroyed, the orbit filled with carcinomatous tissue, the orbital bones involved and there was every reason to believe that the disease had extended within the cranium. The clinical diagnosis of carcinoma had been confirmed microscopically by Dr. Wilder. Treatment was undertaken with x-rays with the feeling that there was only the remotest fighting chance.

During the first month that the patient was under treatment the acute pain from which he had been suffering disappeared and the tumor shrunk considerably. During the second month of treatment, however, in spite of the fact that x-ray effects were carried to the point of producing an acute x-ray irritation, the tumor increased and excruciating localized headache appeared. From the character of the headache there seemed no doubt that the tumor was developing rapidly in the meninges and, as the disease was progressing even on the surface where the x-ray effect was greatest and was apparently being uninfluenced by the treatment, we concluded that the case was certainly beyond control and that further treatment was useless. November 23 he was accordingly discharged, having at that time an acute x-ray inflammation over the whole involved area. There seemed every reason to believe that he would die quickly. On April 30, however, five months after treatment was discontinued, I received the following letter from Dr. T. Sprague of Sheffield, Ill., to whose thoughtfulness I am indebted for the ability to make this report:

Dear Doctor: I write you regarding the condition of Mr. ——, an old gentleman whom you treated for carcinoma of the right eye, discharged as incurable (if I am correctly informed by Mr. ——) about the last of November. He was a charity patient and I think was referred to you by Dr. Wilder. He called on me on his return from Chicago, had a recipe calling for tablets of a quarter of a grain of morphin, to be taken when in pain. I saw that he had about twenty tablets. I noticed the condition of his eye at that time and concluded from my examination that it was only a question of time, and short time at that, with him. I saw him yesterday and he presents an entirely different appearance. The mass that occupied the orbit has shrunken, allowing the lids to close. He is free from pain, eats and sleeps well, uses no anodyne. There are a few little nodules on the nose near the commissure of the eyelids. With that exception he looks quite well. He has certainly gained since coming home, and I feel assured it is the result of the x-ray treatment. I should like you to see him again, but, of course, his means being limited, he would have to go to the Eye and Ear Infirmary as before.

This case is instructive in at least two particulars. It illustrates very strongly, in the first place, the persistence of x-ray effects. Here is a case in which the effects produced by the x-ray persisted for months after discontinuance of treatment and were sufficient to cause the disappearance of a tumor and at least the symptomatic relief of a case, which upon the basis of all experience could end only in death within a short

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time. We have been made familiar by unhappy experience with the progressive and long-continued effect of x-rays in x-ray injuries; it is something of a recompense to find these same qualities serving us in the therapeutic use of the agent. The next fact is the evidence in this case of the deep-seated effect of x-rays. That this tumor involved not only the orbit and orbital bones, but the surrounding intracranial tissues as well there is almost no room to doubt. The result, therefore, gives unmistakable evidence of the deep-seated action of the rays. Such a case offers another lesson, and that is the agreeable surprise from the use of x-rays that may confront one in even the most desperate case of circumscribed carcinoma.—Journal of the American Medical Association.

COMMENTS.

We reprint the report entire because of its importance and interest. Dr. Pusey assures us that up to this present month he has not heard of a recurrence in the case. We have noted a few cases in which marked improvement occurred some time after the discontinuance of the treatment, but none where the prognosis was so hopeless. The case certainly points to the necessity of continuing the treatment for some months before concluding that the x-rays will not benefit the patient.

THE MEDICO-LEGAL VALUE OF THE ROENTGEN RAYS.

BY CARL BECK, M. D., OF NEW YORK.

In the Medical Record of Aug. 9, 1902.

The author mentions the value of the rays in differentiating fractures from dislocations, contusions, distortions and tumefactions. Those unduly conservative made much of the errors in the interpretation of skiagraphs. Some of these misinterpretations were caused by insufficient anatomical knowledge as well as technical shortcomings with which the rays have nothing to do. Those times have passed. Their value is fully appreciated by the surgeon, but the court has not yet recognized their value.

As to their value in cases coming under his own observation he gives the following:

"Long before the Röntgen era, when I was a young assistant, a woman was referred to me for an obscure swelling along the first phalanx of the index finger. The anamnesis revealed that the swelling had come on slowly after she had wounded herself with a needle. She reported that the needle was broken, but that the fragment was pulled out by herself. There was but little pain, but much functional disturbance. The impression prevailed that there was an inflammatory process caused by an infected needle. Later, when fomentations and immobolization were of no avail, rheumatism, osteitis, and then tuberculosis was suspected, and, besides the application of tinct. iodi, internal medicines were administered. No improvement being obtained, I studied all the textbooks available for information, but my scientific thirst was not quenched. My old routined chief, whose advice I then sought, suggested that I should make an exploratory incision, which I did. How great was my surprise when I found a small needle-fragment buried alongside the phalanx! I have never forgotten the feeling of humiliation which overcame me then in the presence of the patient. But I believe that I do not stand alone in this experience. To-day a simple glance with the fluoroscope would at once have pressed the extraction-forceps into my hands.

"This experience also reminds me of the case of a man (demonstrated by me before the Surgical Section of the New York Academy of Medicine) who carried a thick glass splinter underneath his zygoma for thirty-eight years, experiencing but little pain, until, shortly before Röntgen's discovery, a swelling below his eye led him to seek medical care. The swelling was regarded as a malignant growth. He lived in a country town, and was advised to go to New York and have his superior maxilla resected. On making an incision I found the glass splinter, and when the patient saw it, he remembered that when a boy he was wounded in his face by the explosion of a glass bottle containing gunpowder. The facial wound had healed without reaction. In this case, also, the Röntgen rays would have made the nature of the growth clear at once.

"An odd pendant to the needle case is illustrated by the skiagraph of the foot of a dwarf, which I made two years ago. For about two years the hero of the tragic comedy had been a round-trip patient in most of the reputed clinics of New York City. He showed a slight swelling at the outer aspect of his foot, which was diagnosticated as periostetis, osteitis, osteoma, osteosarcoma, beginning tuberculosis, rheumatism, arthitis, syphilitic proliferation or exostosis, badly united fracture, etc. Later on amputation, as well as exploratory incision, was advised. After having suffered for more than two years, he was ready now to submit to anything which would relieve him from the pain he suffered while walking. I was unable to make a diagnosis with the usual methods, but the Röntgen rays cleared up the situation at once, showing a needle in the sole of his foot. When the patient was informed of this fact, he remembered that about two years ago, while sleeping on a lounge, he fell on the carpeted floor and noticed a sharp pain in his foot, which he explained by the fall itself. He had undoubtedly fallen on a needle sticking out of the floor, and by walking he had shifted it up into the joint, from which I removed it under considerable technical difficulties. It is needless to say that his 'rheumatism' disappeared at once."

A most interesting case in Russia shows the need of the x-rays:

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"Much more serious, from the standpoint of humanity, is the following case, reported by Dr. L. Passower, Riga (*Aerztliche Sachverstaendigen-Zeitung*, No. 15, 1901). In November, 1897, a young farmer, suffering from a swelling of his foot, was admitted to the surgical division of the army hospital of Riga (Russia) for observation. Being a recruit, he was expected to serve his military term. But a year before a mass, weighing thirty-five pounds, had fallen on his leg, causing an injury which compelled him to stay in bed for three months. It was reported that during that time the foot had appeared much swollen and ecchymotic. When admitted to the service of Dr. Passower at the military hospital he was limping and complained of a continuous pain in his foot.

"He was assigned a bed among old soldiers, who were requested to watch him closely, as he was suspected to be a malingerer. Three days after admission Dr. Passower received an anonymous letter, signed by 'a friend of the recruit,' which contained the information that the patient had produced the swelling himself, constricting his thigh and injecting medicamentous substances underneath his skin. Dr. Passower stated that he did not pay much attention to this communication, but deemed it his duty to order a still closer watch by adding a subaltern medical officer (Feldscheer) and a professional nurse to his outpost. Besides this, he, as well as his assistants, visited the poor victim repeatedly and unexpectedly during night time, but were never able to discover anything wrong. After two weeks the œdema had subsided, but the tarsus still remained thickened, motion of the ankle-joint also remaining painful. Especially pressure on the scaphoid bone produced intense pain. As soon as the bandages were removed the œdema returned. So Dr. Passower came to the conclusion that the patient suffered from a chronic inflammatory process of his tarsal bones, produced by an injury. The possibility of a fracture of one of the bones was also duly considered.

"After four weeks' observation he was presented to the medical board of the hospital, which suggested that he should be exempt from military service for a year. It was expected that the swelling would gradually disappear if the patient could enjoy rest at home and regular treatment. But the military commission of Riga did not accept this suggestion, because one of its physicians insisted upon the theory of the artificial origin of the swelling. So the unfortunate candidate was sent to the City Hospital of Riga, where, after a second examination, he was accused of having injured himself by constriction and puncture in order to get rid of his military obligations. So he was delivered to the public prosecutor, but set free after a long trial, and especially through the efforts of Dr. Passower.

"A few weeks later he was again arrested and sentenced to three months' solitary imprisonment for self-mutilation. Now Dr. Passower recommended transferring the criminal to the clinic of Professor W. W. Koch in Doypat, in order to obtain a skiagraph. This was at last permitted, and so Professor Koch had a chance to ascertain that there was a fracture of the astragalus, which had caused sinking of the sustentaculum of the astragalus. The patient appealed to a higher court, which dismissed the previous sentence. At the end of February, 1900, the government referred him back to the military hospital in Riga, where he was skiagraphed. (It seems that a Röntgen apparatus was not obtained in this university town until then.) The evidence in favor of the 'criminal' was too overwhelming, and so he was declared unfit for the military service.

"Thus an honorable man was virtually imprisoned during a period of three years. If a skiagraph had been taken at the time of his admission at the military hospital (fully two years after the publication of Röntgen's discovery), the whole procedure of ignorance and malicious arrogance would not have been set in motion, and the psychical torture of another poor individual would have been rendered impossible. In the face of the skiagraphic illustration of the fracture of the most important bone of the foot-skeleton, no judge and no jury would have dared to dispute the claims of the patient."

Another interesting case is given in which the wound or intermedium cruris was taken for a fragment severed from the astragalus:

"The practical significance of this bone is evident from a case described by Wilmans of Hamburg. A laborer claimed that he was injured by an iron bar on January 20, 1897, but was able to work during the whole day. On the following day he called on Dr. Wilmans, complaining of intense pain at his internal malleolus. He limped and asserted his inability to work. Wilmans found a slight swelling below the right internal malleolus. Ecchymosis of the skin being absent, the swelling was attributed to the presence of a considerable degree of talipes, from which the laborer suffered at the same time. The leg was elevated and the fomentations were applied for several days. The patient still complaining of great pain, it was decided to transfer him to a hospital for observation. When discharged, after several weekes of treatment, the laborer made an effort to resume work, but at once declared that he was unable to keep it up. He was therefore admitted to another hospital, where he repeated this maneuver several times during a period of six months. Finally, he claimed damages for having been crippled by the injury sustained on January 20, 1897, but in view of the negative objective condition found by Dr. Wilmans, the society decided not to grant any claim. The consequence was that the

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man was transferred to the surgical division of a third hospital for further observation. There he complained that he had continuous pains below the right external malleolus, even while in the recumbent position. The pain increased during walking or sitting. Stepping on the right heel he also declared to be impossible. By distracting his attention, however, it was noticed that he could stand well on his heel, and he would doubtless have been declared a malingerer had not the Röntgen rays come to his rescue, at least temporarily. A skiagraph showed a bone-fragment at the junction of the astragalus with the posterior surface of the calcaneum. On the strength of this skiagraphic 'proof' Dr. Wilmans, though still mistrusting, was forced to modify his original opinion and certified that the patient suffered from 'fracture of the astragalus, in consequence of which he was damaged for life.' The laborer therefore received an annuity of 30 per cent, in proportion to the estimated curtailing of his wages. Soon afterward the laborer was seen by Dr. Wilmans carrying a heavy load without any apparent pain, while formerly he had claimed to be unable to walk without a cane or crutch. Now Dr. Wilmans insisted upon a second irradiation, this time also skiagraphing the uninjured left foot. The skiagraph showed the "severed bone-fragment," which had first been regarded as a sesamoid of the musculus flexor longus hallucius, but which now was recognized as a normal or intermedium cruris. The society, of course, refused the annuity, and the German supreme assurance court, to which the man appealed, not only sustained the verdict of the society, but also decided that the laborer must return the annuity which he had unjustifiably enjoyed for eighteen months.

"In this case the Röntgen rays were very near becoming the contrary of what they are expected to be, namely, a protector of dishonesty. But the fault would have lain with the insufficient anatomical knowledge and not with the rays themselves, which reproduced the condition exactly as it was. The repetition of such cases, however, is highly improbable."

"It is not always possible to show the evidence of a fracture as long as twelve years after its occurrence, as in the case of the laborer described, in which the displacement proved that there was fracture of the coronoid process of the ulna. The older the fracture, the less the fracture-line will appear. In case of the entire absence of displacement it is only a very distinct skiagraph that shows the line clearly. It is natural that in such cases there is no skiagraphic evidence after recovery—that is, in from four to ten weeks, according to the type of the fracture. Should a jury in such an event doubt that there has been a fracture, a skiagraph taken after such a period will show a negative result, although there surely was a fracture. At my last demonstration I showed you a boy whose fracture of the femur could not be shown by a very distinct skiagraph taken two months after the injury, because there was blameless union. Had I not skiagraphed the thigh shortly after the injury, no evidence of the fracture could have been obtained subsequently.

"In the case of a girl who sustained a fissure of the head of the radius followed by considerable functional disturbances, the blameless skiagraph, taken four weeks after the accident, showed ideal union, so that no fissure-line could be recognized. This also proves how quickly the evidence of the presence of a fissure becomes lost if there be perfect approximation. (Case presented to the surgical section of the Academy of Medicine, January 14, 1901; see *Annals of Surgery*, April, 1901.)

"This experience suggests that a mediocre or even indistinct plate should never be admitted in court. It has repeatedly occurred to me that I was not able to discover a fissure, or fracture-line in a mediocre skiagraph, which appeared well marked in a blameless one. Such facts explain very well why some surgeons have disputed the reliability of other fellow-observers. Dr. A., for instance, insisting, and properly, upon his own diagnosis, while Dr. B., with his poor skiagraph, ridicules Dr. A.'s imagination, sneeringly asserting that he could find no fissure-line. Of course, Dr. B.'s opinion is thoroughly honest, but absolutely erroneous, nevertheless. It should also be considered that during the first days of the injury the presence of a fissure is easier overlooked than later when callus-formation begins.

"But that even in a fairly good skiagraph a fracture, followed by no displacement, can be overlooked, is illustrated by the patient whom I present to you, who sustained a fracture of the middle of the radius three weeks ago, a heavy brick having fallen on his outstretched arm. He had great pain at the seat of the fracture, his hand was slightly swollen, and there was disturbance of function. Crepitus could not be elicited. A fluoroscopic examination made by myself, as well as by a number of physicians, revealed nothing abnormal. A fairly good skiagraph made at the time proved negative. Another one, taken in the opposite direction, gave the same result. But my suspicion that a fracture was present was so strong that I made a third exposure, this time long enough to bring out the bone-texture, the result of which was the faint representation of an oblique fracture-line at the point of tenderness. A fourth skiagraph, taken from the extensor-side, revealed the fracture-line still more distinctly.

"When in this case I was unable to represent the fracture at first, some of the physicians present suggested that this was a proof of the integrity of the bones and that the soft tissues, perhaps a nerve, were injured. But, as a rule, injuries of this kind are only found in nerves, when there is a synchronous injury of the bones, the fragments of which generally produce the trauma of the soft tissues. In a case of this kind

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a difference of opinion between experts may happen in court, and the patient may become the victim of an imperfect technic.

"A counterpart to this case is the one of a boy who was under my treatment after extirpation of his cervical glands, and who sustained a contusion of the forearm, while I happened to be absent from the city. So he was referred to a brother physician, who was supposed to be an expert in Röntgen science. Relying entirely upon the fluoroscopic screen, he claimed to have seen the fracture line and reclared a photograph to be unnecessary. A plaster-of-paris dressing extending over wrist and elbow, was applied in consequence. A few days later, when the patient was referred back to me, I made a fluoroscopic examination of the arm, and as I could see no fracture line, I took a skiagraph through the plaster-of-paris dressing. No evidence of fracture being found, I removed the plaster-of-paris dressing, although the bones presented themselves very distinctly. This third skiagraph proved that there was absolutely no fracture, a fact which was corroborated by the perfect function of the arm.

"These two cases afford further support for the demand that only blameless skiagraphs should be admitted as evidence in court."

Another question is liability for damages in cases of obscure diagnosis:

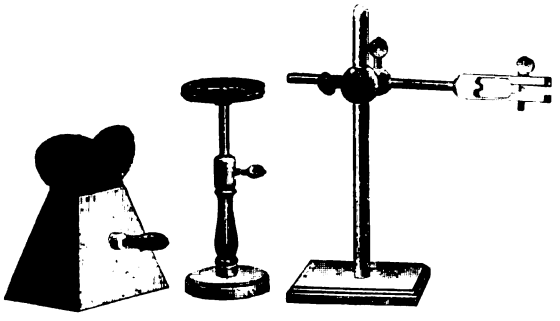
"A girl of twenty-three years fell downstairs on March 5, 1902. The family physician found considerable deformity, which he corrected to a great extent. When the swelling surrounding the whole elbow did not subside after a week, he referred the patient to me. Before I made a Röntgen examination I had the impression that there was a fracture of the external condyle. But the skiagraph revealed the presence of a fracture of the head of the radius, associated with considerable displacement, infraction of the external and fracture of the internal epicondyle, the latter injuries without displacement. Since I could locate the displaced radial fragment so well by the rays, I assumed that I could now also succeed in reducing it. But I was not able to palpate it. A fairly large number of physicians tried the same, but, with the exception of a young practitioner, none could feel it. So I marked the position of the fragment as my anatomical knowledge indicated it and pressed inwardly. Now I applied a fenestrated plaster-of-paris dressing, through which I took the skiagraph. This showed most impolitely that I had not only failed in my efforts of reposition, but had even made it worse. Now I tried to reduce it in the extended position, as it is indicated in the third skiagraph, and there I could press the fragment nearer to its normal position. This encouraged me to make a fourth attempt in the same position of the arm, and this time I succeeded fully, as the skiagraph shows. As you see the result is a good one.

"In this case a diagnosis without the Röntgen rays was simply impossible, and without the diagnosis the patient would surely be crippled. It was not until weeks had passed and the swelling had subsided that I was able to grasp the radial fragment, which is of such great importance in view of its joint surface. Would the court have the right to censure the physician if he had not advised skiagraphy? Could he be accused of professional negligence? If litigation ensued, would the other party have had the right from the beginning to insist that a skiagraph be taken? And if I had not succeeded in reducing the fragment, would I have been criticized? I leave these questions to our learned lawyer friends. What, I may ask further, does secure the identity of the patient who is skiagraphed? Is it sufficient that he signs his name on the envelope of the plate, with a pencil containing impermeable substances, so that his signature is photographed together with the limb, or it is necessary to have a witness present, or both?"

Comment: Cases like those above mentioned are not infrequent and yet are rather the exceptions. There is now the danger that x-ray enthusiasts go to the extreme of demanding the use of the x-ray in every case. Now while this should be done wherever convenient and above all wherever the diagnosis is obscure it must nevertheless be admitted that surgery has been successful in the vast majority of fractures without the aid of the x-ray. Dr. Beck does well to state that a faint picture is of no value whatever.

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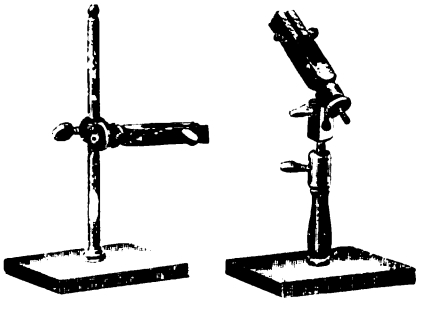
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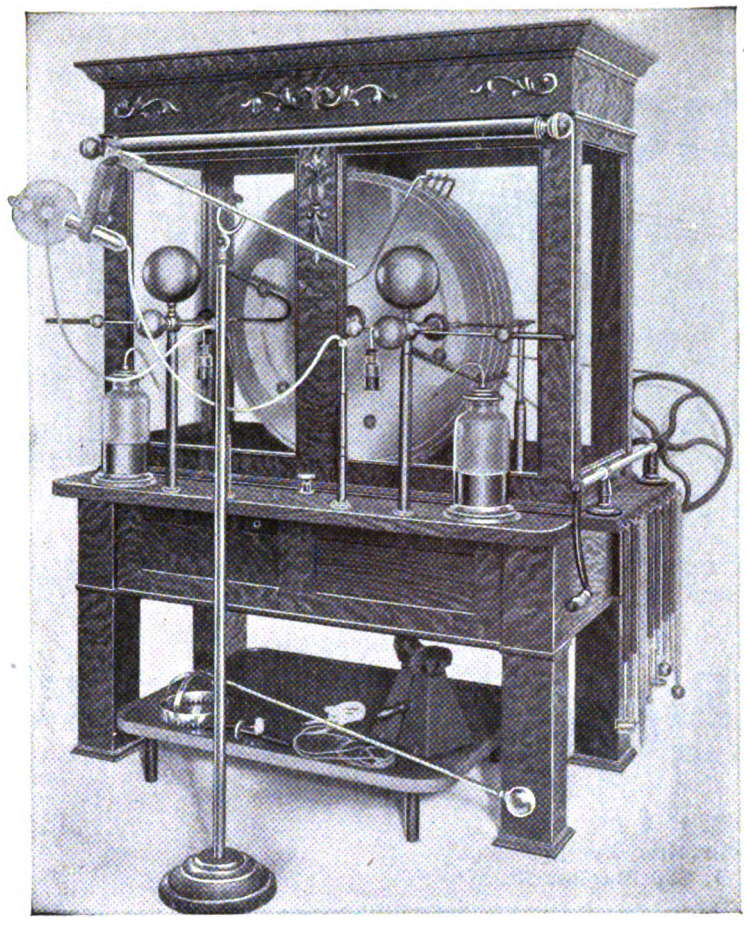
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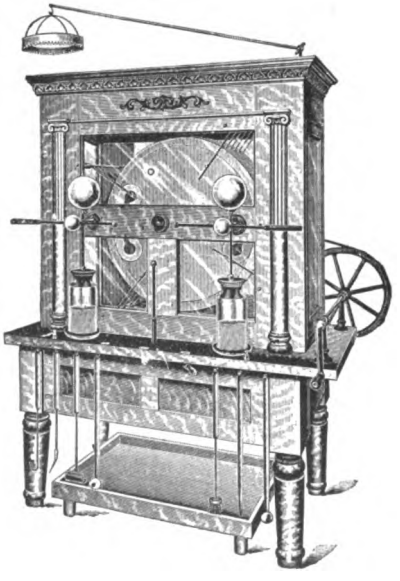
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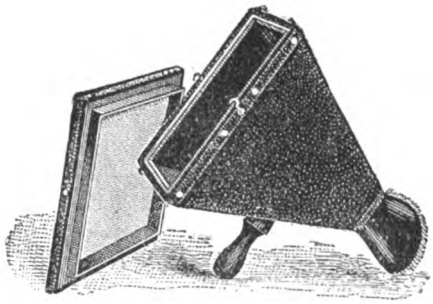
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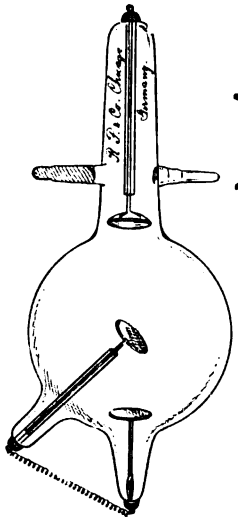
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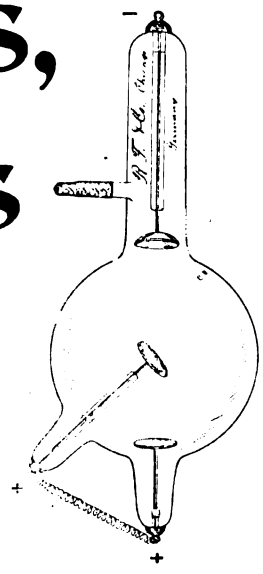
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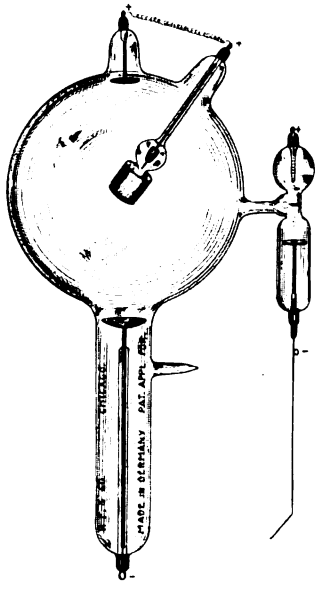
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VOL. II December, 1902 No. 12

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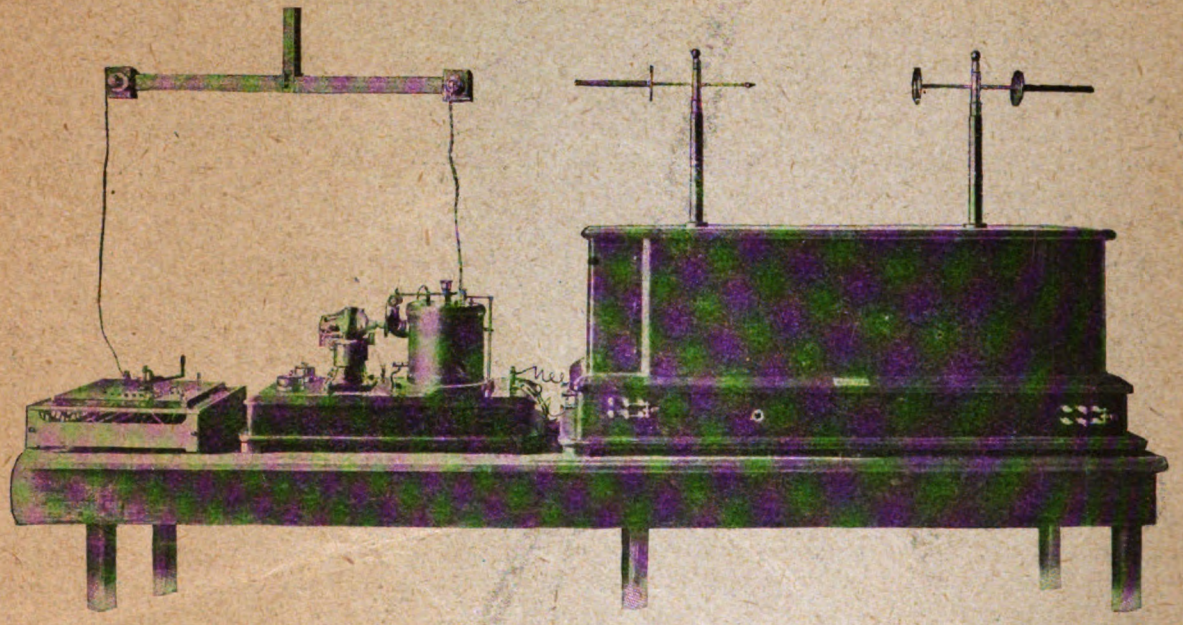
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AMERICAN
Electro-Therapeutic and X-Ray Era

A MONTHLY JOURNAL DEVOTED TO THE MOST RECENT RESEARCH AND PRACTICE WITH ELECTRO-MAGNETIC AUXILIARIES, THEIR STRUCTURE, IMPROVEMENTS, ETC.

VOL. II. CHICAGO, DECEMBER, 1902. No. 12.

ORIGINAL CONTRIBUTIONS.

THE ROENTGEN RAY AS A THERAPEUTIC FORCE FROM A CLINICAL STANDPOINT, WITH ILLUSTRATIVE CASES.*

By John B. Murphy, A. M., M. D., Professor of Surgery, Northwestern University Medical Department, etc., Chicago, Ill.

To present the subject of the Roentgen ray from either a therapeutic or clinical standpoint is too exhaustive a subject for one evening's discussion. I have therefore selected a few practical things in connection with the work in this particular sphere. It seems to me that our knowledge of the therapeutic effect of this force has to be cumulative; that is, that we must have a few experience meetings like this one before we can tell just where we are. And it is for the purpose of adding to this experience that I am here before you to-day.

In the use of the X-ray we first applied it to the fracture element of surgery and in that field we have found it to be of enormous benefit in throwing light on the conditions of a fracture. We have also found, however, that it has some failures and some very disastrous failures, too. One of the striking features of this particular type of work is illustrated in these two pictures (indicating). One of these pictures is that of a fracture of the radius with apparently no disturbance whatever of the ulna. The second picture is another illustration of the same arm. This case was referred for treatment to a surgeon who was not a general surgeon, but a general practitioner who did surgical work. He felt himself thoroughly competent to treat this fracture of the fore arm, and there can be no question that he was competent; but he was at fault in placing too much reliance in his X-ray picture, which shows that there is no fracture of the ulna. Neither of the two pictures shows any fracture or deformity of the ulna. He applied a dressing, using the unbroken bone as a splint for the broken bone. Upon removing the dressing he found to his great surprise and astonishment that the arm had a distinct and decided curve. With the fluoroscope he discovered that there was a distinct deformity and fracture of the ulna, which showed itself about ten days after the original injury. That shows us one of the errors of the X-ray in fracture work. We should not place too much reliance on it, especially when the clinical evidence is to the contrary.

I do not wish to speak too much of the bone elements of the X-ray, except from a diagnostic standpoint, other than in connection with fractures. Is it of value from other standpoints? Yes, and of a most decided value. To support the position I take in this matter I will show you some skiagraphs of tuberculosis.

You are all well aware that in relation to tuberculosis in the neighborhood of joints it is often a very serious question whether the bone is involved at all, or whether it is purely a synovial tuberculosis. It has been my experience in tuberculosis of joints that where I have seen the case early I have always found that it is, and particularly in the knee joint, primarily a lesion of the bone only, and that it becomes a synovial lesion as a secondary matter. I will cite a striking illustration of this.

A patient was admitted to the hospital as a case of tuberculosis of the synovial membrane with no primary focus in the bone. He was treated by injections into the joint with the expectation that these would cure him, but they had no effect, and the skiagraph subsequently showed that the carpal bones were involved. Now we learn, with the assistance of the X-ray, just what class of cases are going to be benefited by the injection of formalin, iodoform and glycerin. We have been injecting this solution for a good many years and we have found that occasionally a case would improve and get perfectly well, whereas the next case was not affected in the least by the very same treatment. It was a little difficult for us to understand how that could occur. To-day the X-ray informs us just when we are dealing with a case of primary synovial tuberculosis, where we have hydrops of the knee joint, and a tuberculosis of the synovial membrane only. We inject that case with the emulsion of formalin, iodoform and glycerin and the patient goes on to recovery without interruption. When

*Read before the American Roentgen Ray Society, Dec. 10.

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we have a case of the type where the disease has not yet ruptured into the joint, and where the joint involvment is merely an effusion without any communication with the lesion in the bone, there is practically no relief whatever from the injection of fluids into the joint, and we should not expect any, because they do not come in contact with the primary tubercular lesion which is situated in the bone.

The X-ray is not only an aid in making a differential diagnosis in these cases, but it is also an aid as a therapeutic agent in tuberculosis of the bones and joints. I have had a very gratifying experience with it in two cases of tuberculosis of the knee joint involving the synovial membrane. They were injected without producing the desired effect. The X-ray was then used, and one case, in which the effusion had existed for nine months, was discharged from the hospital twenty-one days after admission without a particle of effusion or the slightest diminution in the range of motion of the affected joint. I never got such a result before where I simply injected the mixture of formalin, iodoform and glycerin. By putting on the X-ray and stimulating the production of new tissue, as we know the X-ray does, there was almost immediate restoration of the synovial membrane to its normal function of secreting and absorbing so that there was not a particle of retained effusion in the joint.

Not alone in this type of tuberculosis of bone has the X-ray shown its striking features, but I also have ce cases of tuberculosis of the spine in which its use was followed by the most striking and gratifying results. Tuberculosis of the spine is occasionally accompanied by a paraplegia. That paraplegia has heretofore been attributed to the kyphosis and the compression of the cord produced at the point of bending. Now we know that it is not the deformity of the bone at all that produces the paraplegia, and that the compression occurs from the formation of a tubercular granuloma from the body of the vertebra anterior to the cord. When the tubercular condition ruptures through the compact bone it forms a granuloma within the spinal canal, and it is this granuloma that produces the compression of the cord and the paraplegia.

The question came up in Victor Horseley's citation in his cases of tuberculosis of the spine. He went in behind this granuloma, doing a laminectomy, curetted the body of the vertebrae, opening not the dura but the inal canal, and in this way relieved the pressure. I have done that operation for the relief of pressure three times, twice with good results and once with a failure. It was this particular case in which the operation failed to give the expected relief, that led me to the use of the X-ray for its therapeutic effect in just this class of cases. You will pardon my citing a case, but I do so because it is a forcible one in illustrating the use of the X-ray in this very serious lesion.

The patient, age 36, a farmer, was lifting a hog from a sling when he suddenly felt a pain at about the fifth dorsal vertebra. The pain gradually increased in se- ity, although he was able to be about for a week. I saw him 38 days after the accident, as he called it. He said that he did not fall down when he had the pain, nor did he drop the hog, but carried it to the place where he had originally intended it to be. When I first saw him he had a beginning paraplegia from the point of the injury down. I could not believe that a tuberculosis of the spine originating in an adult could advance with such rapidity as to produce a granuloma sufficiently large to compress his cord in that short period of time. Consequently I made a diagnosis of sarcoma, because we know that an osteosarcoma following trauma can develop with great rapidity.

With a large hypodermic needle I made a lateral puncture in between the ribs, through the pleural cavity and into the body of the vertebra and succeeded in getting a drop of pus and tubercular debris. Dr. John Deaver, of Philadelphia, who was in Chicago at the time, saw the case with me and confirmed the diagnosis. The next question was, what could we do for that man other than to do a leminectomy to stop his rapidly advancing paraplegia. After a thorough consideration of the subject I decided to put him on the X-ray treatment. The first few days after its application his paraplegia continued to get worse. After the third application of the ray his pain disappeared, and after twenty-five applications his paraplegia had entirely disappeared and he was able to go home. To show you how thoroughly it disappeared, he went hunting, shot chickens and incidentally shot off a part of his foot. I also used the X-ray to hasten the healing of his foot.

The second case was one on which I had performed a laminectomy a year before. There was absolutely no improvement; in fact, he was worse after the operation than before. There was already a mixed infection at the time of operating and a discharging sinus resulted. There had been a number of fragments of bone discharged in the year that had elapsed. I curetted, but without any result, and I finally put him on the X-ray to heal his bone tuberculosis. Twenty-one applications of the ray closed the sinus completely, so that instead of having a rather profuse discharge there now was none. It did not help his paraplegia any, nor did we expect that it would, because his cord had been destroyed by the tuberculosis and the mixed infection which had been present from the beginning.

The third case was a patient, paraplegic, suffering intense pain and taking one-third of a grain of morphine every two hours to secure partial relief. He was unable to move and was confined to bed all the time. He was put under the X-ray. The first two applications (and that is one of the peculiarities of the X-ray), stopped his pain, and although it did not remove

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the tumor, yet it stopped its rapid growth. I received a report from that patient to-day. He has had twenty-three applications of the ray and is now walking about on crutches. From the second day of the application of the ray he has not had a hypodermic of morphine. I think I can safely say that the prognosis in this case is exceedingly good.

These are three cases of tuberculosis of the spine associated with granuloma in the spinal cord, which I think are very striking from a clinical standpoint, particularly as to results and the relief given the patient.

The value of the ray in the diagnosis of lesions of the chest as aneurysms, etc., is not necessary for me to dwell on, but its use in the diagnosis of renal calculi is well worth considering. There is an uncertainty in the diagnosis of a renal calculus, and that uncertainty depends upon two conditions. First, defects in the plate, and, second, deviations in the density of the calculus. I am pleased to see here to-day Mr. Fuchs, the man with whom I have collided most frequently as to the absence or presence of calculi in his pictures. I always tell him that he sees everything in his pictures, and I always take the opposite side, so that he will more positively prove that what he sees is there. Nevertheless errors will occur. In looking over the reports of an English hospital I find that in about eight per cent of cases in which the X-ray showed a stone the surgeon was unable to find one. First, because in some of these cases the stone was not there, and second, in a number of them the stone was there but the surgeon was unable to find it. We have had a few striking examples of that kind occur in this city where the stone was pictured by the X-ray. An exploratory operation was made, but the stone was not recovered. A second picture again showed the stone and when the patient was operated again the stone was found. Still, I believe that many of the so-called errors of the X-ray are due to conditions over which we have no control, such as accumulations in the alimentary tract that will give a shadow of a stone on the plate, etc.

The question of the treatment of malignant disease with the X-ray is one that concerns us most. I believe that that is the one condition where we had hoped that the X-ray would come to our rescue. Surgeons are generous people and they would gladly give all the malignant cases to any one who could hold out a single ray of hope. The X-ray has not, however, been without some result. I have brought a slide taken from a specimen that was very instructive to me, a case of very large carcinoma of the breast. The tumor appeared to be about as large as an ink-well and was covered by the skin and surrounding tissues. The patient was a very old lady, and as I considered the case an inoperable one I referred her to Dr. Wm. Allen Pusey, of this city, for treatment with the X-ray. It was really remarkable to see the rapidity with which the size of that tumor diminished. After about twenty-one or six applications the patient had an attack of gastritis, which persisted until she finally succumbed.

We succeeded in recovering the specimen of the tumor and it was very instructive. First, because of the fact that the ray reduced the size of this large mass to one 2½ centimeters wide and 4 centimeters long. Second, because of the changes in the tumor itself. We sectioned it and when we came to examine the microscopic specimen we found that the changes were of two kinds. First, an increase in the connective tissue; second, a decrease in the cellular elements of the carcinoma. The connective tissue stroma became enormous in proportion to the cellular elements, but still the shape of the cells in their various epithelial pockets did not appear to be changed. It did not show that there was any strangulation of the cells by the contraction of the new formed connective tissue, and yet there were changes in the cells. The protoplasm had undergone a change. The cells showed vacuolization, but the nucleus did not seem to have changed at all. It seemed to be the part of the tissue which was the least affected. Now it has been our belief for a long time that in the repair of carcinoma the X-ray acts by destroying the cell, or by an impression produced on the cell which prevents the regeneration of cells of the same type. The cells in this tumor were all changed in about the same way.

Another interesting feature in this case was the fact that the glands had not changed in the least through the application of the ray. They were typical carcinomatous glands, and even the gland just outside of the breast, which must have received the full force of the ray, was not affected by it in any way. That is an important feature the interpretation of which time will have to clear up.

This was the most pronounced effect in a deep lesion, that is, a lesion beneath the surface of the body. We have had in Mercy Hospital cases of typical carcinoma that were not affected by the X-ray. We have also had a considerable experience in cases of deep-seated carcinoma of the intestinal tract without any pronounced effect. Of cases of superficial epithelioma I distinctly recall one case of epithelioma of the eyelid which was entirely healed, one of the most perfect repairs I have seen.

We have not even learned, however, in treating lupus with the X-ray just what class of cases are going to get well and those which are not. I remember one case we had in Mercy Hospital that did not get well. In fact, the disease continued to develop and new foci appeared and continued to form during the treatment. We subsequently treated the case by a plastic operation. We will learn the differential part of this work when we become a little more familiar with the disease. In the treatment of the deep-seated carcinomata we must learn to change the tension of

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a physician who knew little or nothing about the use of the X-ray, with the result that the patient died in about two weeks. The speaker did not learn the cause of death, although he is convinced from the progress the case was making that in proper hands it would have gone on to ultimate recovery. He believes that every case of cancer that is not cured would have been if the treatment had been given properly.

Dr. K. Dunham, of Cincinnati, O., makes it a rule to examine the blood of every case and he has found that the leucocyte which should be watched is a large faintly staining mononuclear cell. When this leucocyte diminishes in number he feels encouraged, especially when the polynuclear leucocytes have increased. If these latter diminish in number there is ground for fearing the outcome of the treatment.

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Dr. Murphy, in closing the discussion, said that he did not doubt that the X-ray was a great therapeutic agent, but that its real limitations and exact method of application were as yet unknown. It is important to make a correct diagnosis, to learn the exact pathology of the processes treated, and, if possible, to make microscopic specimens of the growth after treatment in order to see what changes have taken place as a result of the treatment. We should always endeavor to keep on a firm pathologic basis and if we keep on that the X-ray worker will ultimately meet with success.

ANNOUNCEMENT.

After due consideration we have decided to adopt magazine size for our journal, beginning with the January number of the third volume, and believe that such a change will be welcomed by our numerous readers.

ELECRTICITY IN THE TREATMENT OF CATARRHAL DEAFNESS.*

By Albert H. Andrews, M. D., Professor of Otology, Post-Graduate Medical School of Chicago; Professor of Diseases of the Ear, Nose and Throat, Illinois School of Electro-Therapeutics, etc.

The combination of deafness and tinnitus comprises a group of symptoms probably more prevalent than any other ear symptoms of which patients complain. These symptoms may be caused by three separate and distinct conditions within the ear—namely, disease of the internal ear, sclerosis of the middle ear and chronic non-suppurative otitis media or so-called catarrh of the middle ear. Cerumen or other foreign bodies in the auditory canal may also produce deafness and tinnitus, and conditions entirely independent of the hearing organ itself may be accountable for these symptoms, more especially the tinnitus. However, the latter cases are beyond the scope of this paper. Disease of the internal ear forms a class by itself and it is necessary to consider its treatment separately. Sclerosis, considered apart from inflammatory conditions, is not amenable to any form of treatment which we have as yet been able to institute. Catarrhal inflammations of the middle ear are all more or less amenable to treatment. It is this particular phase of the subject which we are to consider to-night.

It is a well known fact that the anatomic arrangement of the middle ear renders it liable to certain forms of disease peculiar to itself. The middle ear is an air-filled cavity, lined with mucous membrane and situated entirely within the temporal bone. In its normal condition it has but one means of communication with the external world—the Eustachian tube. When the Eustachian tube is occluded the middle ear becomes a closed cavity, and as a result is subject to certain well-defined pathologic changes. The Eustachian tube is on an average about one and one-fourth inches long. Its outer three-fourths is a bony canal lined with mucous membrane. Its inner one-fourth is entirely within the soft tissues of the naso-pharynx. The mucous membrane lining the Eustachian tube is thrown into lognitudinal folds. Its blood supply is very abundant and comes principally from the pharyngeal direction. Any pathologic condition about the pharyngeal meatus is prone to produce the same condition of the mucous membrane lining this canal. Fortunately, however, the tissues immediately surrounding the meatus seem to be less liable to the ordinary disease of the nose and throat than is the nasal mucous membrane on the one side and pharyngeal mucous membrane on the other. In ordinary acute rhinitis, extending to the post-nasal space, the Eustachian tube is sure to become more or less obstructed.

*Paper read before the Chicago Electro-Medical College, Nov. 25.

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the tube, either increase or lower it. It seems to me that if we have a force in the X-ray that can aid us on the surface that we should in some way get the same effect on the deeper lying tissues.

There is another field of usefulness for the X-ray, one that has been but little cited in the literature, and that is the treatment of deep fistulae—intestinal fistulae. That is another class of conditions that annoys the surgeon very much. I have had a number of them and it is remarkable how quickly the X-ray will by stimulation increase the amount of connective tissue and close the sinus. More work can be done along this line with profit to every one, the practitioner as well as the patient.

DISCUSSION ON DR. MURPHY'S PAPER.

Dr. E. H. Grubbe, Chicago, said that in tubercular lesions of bone the X-ray has in the hands of the electro-therapist proven very beneficial. As to fistulas, he has had some very encouraging results.

Dr. A. M. Phelps, of Battle Creek, Mich., in the course of his remarks cited the case of a lady suffering from an extensive carcinomatosis who was treated by the X-ray. She had a perceptible enlargement in one breast for over three years, but did not consult a physician until about six months ago. The entire breast was involved, the glands in the axilla and those under the pectoral muscles; the uterus and liver were enlarged and nodular. The case was considered inoperable and the X-ray was suggested as a last resort. A medium tube was used and the ray was applied alternately over the breast, the liver and the uterus. After the third or fourth application all pain disappeared, the patient gained in strength and felt better. After three months' treatment the skin had turned a deep brown, but was not burnt or inflamed. The tumor in the breast and all the enlarged glands shrunk considerably. The fundus of the uterus was nearly normal in size and only two small nodules were found in the cervix. The liver also diminished in size considerably, but the patient finally succumbed. The autopsy confirmed these findings in every particular. Microscopical examination of the tumor masses showed carcinoma.

Dr. Gordon G. Burdick, of Chicago, related a case of supposed neuroma of the brachial plexus which was treated with the X-ray for about four months and as no improvement was apparent an operation was suggested and accepted. The tumor was removed, and on examination was found to be a sarcoma, which had begun to undergo a fatty degenaration. He believes that if the treatment had been continued a cure would have resulted. The tumor was removed eight months ago and there has not been the slightest sign of a recurrence. Another case of extensive osteo sarcoma of the shoulder joint; the arm fixed; intense pain; requiring the frequent injection of morphine; improved rapidly under this treatment by the X-ray. The patient is free from pain, there is no apparent progress in the growth and the arm is as useful as the well arm. A third case was operated a number of times and recurred after each operation. Under the X-ray the growth shrunk to one-third its former size, the patient is free from pain, has increased in weight and feels well. The last case cited was one of sarcoma of the radius. It soon became soft and diminished in size, but in spite of this excellent progress the patient was persuaded by another physician to submit to amputation. Three successive amputations were made, the last an exarticulation of the shoulder, and after each there was a recurrence. The patient did not return for X-ray treatment.

Dr. J. P. Marsh, of Troy, N. Y., cited a case of melano-sarcoma of the left shoulder and chest with numerous metastases in the skin. The tumor had originated in a mole which had been excised. When the X-ray treatment was begun the leucocytes were counted and numbered 18,000. After each treatment there was a falling off of the leucocytes of about 2,000. The patient became rapidly worse and finally died. The speaker found by observation of cases of this kind that if the leucocyte count goes up the prognosis is favorable. But if the leucocytes diminish the outcome is always bad. He advocated the blood count as a guide in making a prognosis.

Dr. Clarence E. Skinner, of New Haven, Conn., said that sarcomas do not respond alike to the X-ray. He cited a case of sarcoma of the neck, ten by seven inches in size, which had existed for three years that did well after only seven weeks' treatment, the most rapid cure of cancer he had ever seen. The diagnosis was confirmed microscopically. As a contrast he mentioned the case of a man with a sarcoma of the parotid gland, which had recurred after operation. He was treated in the same way as the previous case, but the result was just the opposite. He suggested that this may be an idiosyncracy to the influence of the X-ray.

Dr. J. D. Gibson, of Birmingham, Ala., stated that some of the most beneficial results he has ever seen have been in cases of melano-sarcoma. He had a case, in particular, of melano-sarcoma under the left ear four and a half inches in diameter, which was of more than passing interest. He was operated three times and the tumor recurred again. Then he used cancer paste, but without receiving any benefit. When he applied again for operation several prominent surgeons refused to operate, telling him that he had only a few weeks to live. He then came under the speaker's care and was treated with the X-ray. The mass sloughed out from under the skin, became smaller and smaller until it measured only one-half inch in diameter. He went home after three or four months in a very much improved condition and continued the treatment with

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a physician who knew little or nothing about the use of the X-ray, with the result that the patient died in about two weeks. The speaker did not learn the cause of death, although he is convinced from the progress the case was making that in proper hands it would have gone on to ultimate recovery. He believes that every case of cancer that is not cured would have been if the treatment had been given properly.

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Dr. George P. Edwards, of Nashville, Tenn., has used the X-ray in a number of cases of tabes with most excellent result. In several cases there has been a return of the lost knee jerk with marked diminution of the ataxic symptoms. He uses the high tube over the lower dorsal and lumbar vertebrae, making the exposure in the ordinary way.

Dr. J. Rawson Pennington, of Chicago, reported a case of cancer of the rectum in which an inguinal colostomy had been performed. Four months after the operation the rectum was completely closed. The speaker curetted and removed a great deal of friable tissue. Three weeks later he began treatment with the X-ray, using the high tube and making the application alternately from above and over the perineum and with the induction tube passed into the rectum. In about seven weeks the rectum was again closed; he curetted again, removing more of the mass. The man was feeling better and improving. When he curetted a third time he found the rectum was filled with a firm fibrous tissue.

Dr. Murphy, in closing the discussion, said that he did not doubt that the X-ray was a great therapeutic agent, but that its real limitations and exact method of application were as yet unknown. It is important to make a correct diagnosis, to learn the exact pathology of the processes treated, and, if possible, to make microscopic specimens of the growth after treatment in order to see what changes have taken place as a result of the treatment. We should always endeavor to keep on a firm pathologic basis and if we keep on that the X-ray worker will ultimately meet with success.

ANNOUNCEMENT.

After due consideration we have decided to adopt magazine size for our journal, beginning with the January number of the third volume, and believe that such a change will be welcomed by our numerous readers.

ELECRTICITY IN THE TREATMENT OF CATARRHAL DEAFNESS.*

By Albert H. Andrews, M. D., Professor of Otology, Post-Graduate Medical School of Chicago; Professor of Diseases of the Ear, Nose and Throat, Illinois School of Electro-Therapeutics, etc.

The combination of deafness and tinnitus comprises a group of symptoms probably more prevalent than any other ear symptoms of which patients complain. These symptoms may be caused by three separate and distinct conditions within the ear—namely, disease of the internal ear, sclerosis of the middle ear and chronic non-suppurative otitis media or so-called catarrh of the middle ear. Cerumen or other foreign bodies in the auditory canal may also produce deafness and tinnitus, and conditions entirely independent of the hearing organ itself may be accountable for these symptoms, more especially the tinnitus. However, the latter cases are beyond the scope of this paper. Disease of the internal ear forms a class by itself and it is necessary to consider its treatment separately. Sclerosis, considered apart from inflammatory conditions, is not amenable to any form of treatment which we have as yet been able to institute. Catarrhal inflammations of the middle ear are all more or less amenable to treatment. It is this particular phase of the subject which we are to consider to-night.

It is a well known fact that the anatomic arrangement of the middle ear renders it liable to certain forms of disease peculiar to itself. The middle ear is an air-filled cavity, lined with mucous membrane and situated entirely within the temporal bone. In its normal condition it has but one means of communication with the external world—the Eustachian tube. When the Eustachian tube is occluded the middle ear becomes a closed cavity, and as a result is subject to certain well-defined pathologic changes. The Eustachian tube is on an average about one and one-fourth inches long. Its outer three-fourths is a bony canal lined with mucous membrane. Its inner one-fourth is entirely within the soft tissues of the naso-pharynx. The mucous membrane lining the Eustachian tube is thrown into lognitudinal folds. Its blood supply is very abundant and comes principally from the pharyngeal direction. Any pathologic condition about the pharyngeal meatus is prone to produce the same condition of the mucous membrane lining this canal. Fortunately, however, the tissues immediately surrounding the meatus seem to be less liable to the ordinary disease of the nose and throat than is the nasal mucous membrane on the one side and pharyngeal mucous membrane on the other. In ordinary acute rhinitis, extending to the post-nasal space, the Eustachian tube is sure to become more or less obstructed.

*Paper read before the Chicago Electro-Medical College, Nov. 25.

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In chronic naso-pharyngitis, extending into the tube, the mucous membrane lining this canal passes through the same pathologic changes as do the tissues affected by chronic inflammation in any other part of the body. A patent Eustachian tube is essential to the hearing function. Occlusion of the tube produces a feeling of fullness in the ear, with slight deafness. Whether the deafness will disappear or whether it will increase depends entirely upon conditions within the Eustachian tube. When the tube is occluded for any considerable length of time certain progressive changes occur in the middle ear, a full understanding of which is necessary to their rational treatment. The first change resulting from occlusion of the tube is the absorption of air from the middle ear. The result of the absorption of air is the lessening of the air pressure within the tympanic cavity, and the air pressure from without now being greater than the pressure within the cavity, the elastic drum membrane is crowded inward and the condition results which is known as retraction of the drum membrane. A retracted membrane cannot vibrate freely, and were this the only change occurring impairment of hearing would result. However, the lessened air pressure produces other changes even more disastrous to the functions of the middle ear. It is said that nature abhors a vacuum. Whether this be true or not, nature does seem to make an effort to restore the equilibrium of pressure on the two sides of the drum membrane. It being impossible for air to reach the cavity of the middle ear, nature does the next best thing and attempts to fill the cavity with the only movable substance at hand, the blood. The blood being in tubes or vessels—arteries and veins—and these vessels having elastic walls, they become distended, and the condition results called congestion. In long-continued passive congestion, or chronic inflammation in any part of the body, certain changes take place, chief among which is proliferation of connective tissue. This proliferation of connective tissue occurs in the walls of the blood vessels and around the blood vessels. The tendency of all connective tissue, whether normal or pathologic, is to contract with age. And this connective tissue, being no exception to the rule, reaches a period after a time when contraction begins. The result of the contraction of the connective tissue in the walls and around the blood vessels is a lessening of the lumen of the blood vessels, and consequently a lessening of the blood supply to the part. As a result of the lessened blood supply we have lessened nutrition, and as a final result of the lessened nutrition we have that retrograde change called atrophy.

Clinically the pathologic changes occurring in this disease may be divided into three stages: The first, or simple stage; the second, or hypertrophic stage; the third, or atrophic stage. The line of demarkation between these stages is not clearly defined, but one gradually merges into the succeeding stage. The simple stage includes all the changes up to the beginning of the proliferation of connective tissue. The hypertrophic stage includes proliferation and contraction until, as a result of the lessened nutrition atrophy begins.

So long as the origin of the trouble—the Eustachian tubal occlusion—continues, these pathologic changes are sure to follow. Without stopping to discuss the symptoms of these different stages, let us pass directly to the consideration of the Eustachian occlusion. In acute non-purulent diseases of the naso-pharynx extending to the Eustachian tube the treatment of the naso-pharyngitis is usually sufficient, no special treatment of the Eustachian tube being necessary. The first stage in chronic inflammation of the Eustachian tube is passive congestion. There are many remedies which may be used for the relief of this congestion. Usually in this stage electricity is not necessary, but should it become desirable to use electricity the copper electrode with positive galvanism would be the plan adopted. After the inflammation of the Eustachian tube has reached the hypertrophic stage electricity will be found of decided value. If treatment is instituted early, the positive current to lessen the blood supply and stop the formation of connective tissue is indicated. After this it will be necessary to use negative galvanism to bring about the absorption of the connective tissue already deposited. If treatment is instituted late in the hypertrophic stage, when the proliferation of connective tissue has already reached its limit, the copper electrode with positive galvanism is not indicated, but the negative current is used for its solvent effect upon this abnormal connective tissue. When the inflammation in the Eustachian tube has reached the third or atrophic stage one of two things will be found to exist. First, if the atrophic process begins in the periosteum and extends to the mucous membrane, the mucous membrane will be found firmly adherent to the bone and the Eustachian tube will be abnormally patent. Second, if the atrophic process begins in the mucous membrane lining the tube, annular or other strictures will result. When the Eustachian tube is abnormally patent no treatment of the tube itself is indicated, but if it is occluded either by inflammatory exudates, deposits of connective tissue or by strictures, due to contraction of connective tissue, then treatment of the tube becomes absolutely necessary before improvement in the hearing can result.

The special instruments necessary for the application of negative galvanism to the Eustachian tube are a suitable catheter, a set of gold wire olive-tipped bougies, some arrangement for attaching the cord to the bougie, and a measure for determining the progress of the bougie through the Eustachian tube. The catheter should be of hard rubber or of silver carefully insulated. Rubber tissue wound about a metal catheter

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has been recommended, but my observation is that it is not sufficient. Shellac has been used to insulate the catheter, but it is not easy to apply and is not found very satisfactory. While the hard rubber catheter is best, it has the disadvantage of being more difficult to properly apply to the Eustachian meatus. The set of bougies should consist of three, having tips varying in size from one to two millimeters. The wire should be at least two inches longer than the catheter. It is necessary to know just how much longer the wire is than the catheter so that by measuring the wire extending at the back end of the catheter you may know just how far the bougie has passed into the Eustachian tube. In attaching the cord to the gold wire a spring clip should be used, and the cord should be carried over the top of the patient's head so that the head will carry the weight of the cord, and not permit it to drag down the bougie. With the catheter in good position, the bougie is passed through it into the Eustachian tube until an obstruction is met. Then one to three milli-amperes should be turned on and the tip of the bougie held firmly in contact with the obstruction. Very soon, under ordinary circumstances, the bougie passes the obstruction. This process may be repeated several times before the bougie enters the tympanic cavity. According to reports a number of physicians have used as much as five milli-amperes, but I have noticed that those who have used the stronger current as a rule report adversely as to the results obtained by the use of electricity in the Eustachian tube. My impression after experimenting with a current of five milli-amperes applied to the nasal mucous membrane, where I could watch the result, is that the current is too strong for the size of the electrode, and that a burn results. There is no doubt that when too strong a current is used in the Eustachian tube there will be destruction of tissue and that the scar resulting will contract in time and defeat the very purpose for which the electricity was used.

Usually the patient experiences a slight bubbling sensation in his ears as the electrode passes through the tube. The pain is slight and often is entirely absent. It is well to remember that negative galvanism has no antiseptic properties, and hence the necessity for using great care in the employment of this current in the Eustachian tube and the importance of avoiding inflation of the middle ear for from one to two days afterward.

Treatment of organized Eustachian obstructions has little or no immediate effect upon the condition of the middle ear. By the time the Eustachian tube reaches a condition demanding the use of negative galvanism in its treatment the middle ear is in such a state that measures must be instituted to relieve the pathologic conditions due to Eustachian occlusion. In addition to the treatment of the Eustachian tube, if the inflammation in the middle ear is found to be in the hypertrophic stage, positive galvanism is indicated to lessen the blood supply and to stop the formation of connective tissue. Later negative galvanism should be used for its solvent effect, and to bring about the absorption of the connective tissue already formed. If, when the treatment is commenced, the middle ear has reached a period when connective tissue is no longer being formed, negative galvanism should be used for the purposes above stated.

In applying electricity to the middle ear the tip of an ordinary applicator should be covered with cotton, being sure the end is well protected. A piece of delicate rubber tubing, an inch long, should be slipped over the applicator and the outer part of the cotton pencil, leaving from one-fourth to one-half an inch of the cotton exposed. The cotton should then be wet and pushed into the auditory canal until it comes in contact with the drum membrane. The cord should be carried over the patient's head and attached to the applicator by means of a spring clip. The opposite pole may be held in the hand or, what is sometimes better, may be applied to the pharyngeal meatus of the Eustachian tube. In using electricity in this manner great care is necessary not to use a stronger current than the patient can comfortably bear. It must be remembered that the drum membrane is exceedingly sensitive and that the current must be increased gradually. The patient's feelings and not the meter should determine the amount of current. Frequently a fourth of a milli-ampere is all that can be endured. The best results have seemed to come from the moderate current applied for a considerable time. The examination of the ear after such treatment will show the drum membrane and all the visible parts of the middle ear greatly congested. The treatment should be continued daily for a week or two, and then less frequently as long as improvement seems to justify. A guarded prognosis should be made, for it is not possible to replace lost parts nor to fully restore the function when it has been long impaired. A diagnosis of all the conditions present should be carefully made before treatment is undertaken. The question of diagnosis opens up the whole subject of functional examination, which is entirely too extensive for consideration at this time. While it is not the intention to advocate the use of electricity as a panacea in all cases of deafness, nor to use it to the exclusion of other methods, it is true that a large number of otherwise hopeless cases have been improved by this plan of treatment.

DISCUSSION.

Dr. Coleman was the first speaker. He expressed his approval of the scope of the paper, stating it gave the complete synopsis of the physiology and pathology of the middle ear and in addition the *modus operandi* of galvanic treatment for the various pathologic conditions of the entire ear. In the literature on the sub-

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ject he had found only discouraging reports from the use of electricity and had supposed that the use of galvanism was practically abandoned. In many of these reports the technique was not described and they were therefore valueless as a guide to the investigator.

Dr. Coleman then spoke of his experience, saying he had used an electrode applied to the external ear with negative results. Dr. Andrews' paper explained this failure. Dr. Coleman's experience was more extensize in the treatment of the eye than of the ear, although he was not without experience in the treatment of the latter organ. He had for some time used the sinusoidal current in optic atrophy and in cases of chronic deafness.

APPLICATION OF THE SINUSOIDAL CURRENT.

Dr. Coleman had used up to recently the Eustachian electrode applied in the mouth of the tube and a small sponge electrode on the ear. He now inserts in both ears moistened cotton wool into the external meatus to the tympanum through a hard rubber ear speculum. The current passes through the head between the two electrodes. He regulates the strength of the current to the tolerance of the patient with a carbon rheostat. The length of the seances is ten minutes; treatment every day when possible.

ILLUSTRATIVE CASE.

Patient, a girl 17; deaf six or eight years. Had been treated by other specialists with negative results. Dr. Coleman then began treatment, using the pneumatic aural massage; treatment continued for a year. Before the treatment the voice could not be heard unless the lips of the speaker were placed close to the ear. As a result of the treatments the distance was lengthened three inches. At this time Dr. Coleman had become interested in the sinusoidal current, and he therefore tried it on this case. In three months the natural tones of the voice could be heard a distance of twelve feet. After a lapse of five years the hearing was not impaired.

The above is a typical case of catarrhal otitis media. He had obtained similar results in several such cases. He did not feel like making any dogmatic statements regarding the relative value of the galvanic and sinusoidal currents, but he felt that much of the electrolytic action attributed to the galvanic current had been demonstrated only on dead tissue and the action might not be so pronounced as on the living body. Something is needed to increase the metabolism. That the sinusoidal will do this is shown in that there has been demonstrated an increase of 25 per cent in the amount of CO^2 exhaled in the breath, while the amount is not increased by the galvanic current. The sinusoidal current obtained from a Victor motor with 12,000 alternations per minute sends considerable current through the tissues and the patient can endure it because of the rapidity of the alternations.

Illustrative Cases of Dr. Coleman's.

Patient suffered from optic atrophy; had been treated for one year without improvement by another specialist. Treatment discontinued for six years. It had now become a case of the most pronounced type. The patient was seen by a dozen members of the Opthalmological Society and a diagnosis was corroborated. (This is especially mentioned, because if such a case is not benefited by electricity the diagnosis is not questioned, but should improvement result grave doubts of the diagnosis are raised. The results are indeed almost always negative, nine out of ten being failures, because electricity is used inadequately.) Before treatments were begun the patient could not uniformly count the fingers when placed before the face. Improvement began early in treatment. The patient was soon able to come to the office unattended. Her eyesight was tested with the Snellen chart, which was placed within a few inches of the face. She was able to gain a line about every three weeks, seeing progressively the smaller type until at the close of the year she could read next to the smallest type on the chart at the above-mentioned distance. Dr. Coleman cannot now report on the present condition of the patient, because she has joined the Christian Science church. But he fears a retrogression has set in, since the optic nerve had not then resumed its normal condition.

Regarding electrodes, Dr. Coleman thought that the common electrode should be as effective as the gold electrode, when used as the negative in treating stenosis of the Eustachian tube.

Dr. Coleman was disappointed in that the paper did not tell the use of the X-ray in treatment of the ear. He knew that Dr. Andrews had been experimenting with this agent. He had read reports on its effect upon the superficial lesions of ulcerating character and wondered whether it might not be of value in lesions of similar character affecting the eye and ear. He is at present experimenting along this line.

Dr. Grubbe said he could not discuss the paper as a specialist, but as an electro-therapeutist. The paper well brought out the polar action of the galvanic current. The positive pole is used to increase the circulation and with the proper electrode causes an antiseptic action, since copper oxychloride is found in the tissue. The negative pole is used for its dissolving effect on hypertrophied tissue. Dr. Coleman used the sinusoidal current only for its functional effect. The speaker would like to have the faradic current tried in such cases. The faradic, when slowly interrupted, produces contraction of the muscles and leads to metabolism in the tissues that might otherwise be in a state bordering on atrophy. The rapid faradic and the static surging produce effects on tissues similar to

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those of the sinusoidal; they produce muscular irritation, thus leading to metabolism.

Dr. Burdick stated that he had some experience with the sinusoidal current, but not in Chicago. There is no sinusoidal apparatus, properly so called, in the city. The Victor motor furnishes an alternating current, but not a therapeutic sinusoidal current. Dr. Burdick has seen one in Kennelly exhibit at the World's Fair in 1893. He believed that there are only a few such generators in the country. The apparatus consists of two permanent magnets surrounded with a coil of coarse windings. Between the two magnets there is a mass of soft iron, elliptical in shape, with an axis in the center.

This is caused to revolve and produces a gradual swelling of the current (eight changes of the sine per minute), which is very pleasing to the subject, even though amperage is sent through the muscles to keep them alternately in a state of tetonic contraction and complete relaxation. The magneto by McIntosh does not furnish a therapeutic sinusoidal—the sine changes too many times per minute. Dr. Burdick stated that the alternating is trophic and of value in relieving pain, especially sciatic. Herdman takes the alternating current from the street mains through a water rheostat—i. e., the foot is placed in water. The other electrode is used as labile over the course of the sciatic nerve. Dr. Burdick wanted to call attention to the fact that even in the alternating current there is electrolysis of the electrodes that dip into a salt solution; for example, if two copper electrodes dip into a copper sulphate solution, both electrodes will be "chewed up," one sign predominates. Dr. Coleman is using the plain alternating current and gets plenty of it through the tissues. His encouraging report is evidence of the value of the current. The alterations are rapid. As the motor runs about 1,800 revolutions per minute, the alterations are about 3,600 per minute. In the high frequency apparatus the alterations are as many as one and one-half millions. The therapeutic effects of the high frequency must be still different. This does not produce muscular contractions. It is rather a nerve stimulant.

Mr. Fuchs was called upon to discuss the electric currents. He stated that he had little to add to Dr. Burdick's explanation. He had generated a sinusoidal current by connecting in series the primaries of two induction coils. The second coil has two turns in the primary wound differentially and connected in multiple. By this arrangement the current rises from zero to a maximum and sinks to zero, then instead of sinking below the line as in an alternating current, it again rises to the maximum due to the opposite winding of the second coil.

Dr. Andrews closed the discussion. He favored gold bougies after having experimented with those made of copper, German silver and aluminum. The copper and aluminum was too soft, not rigid enough. The German silver was better in this respect, but would unfortunately tarnish. The gold did not fail in either of these requirements. Dr. Andrews had used the faradic in certain cases where the patient could not differentiate sounds, but all noises would be confused. The opposite conditions occur when the hearing improves in a multitude of sounds—such cases can hear better near a threshing machine than in a quiet room. Dr. Andrews had used the high tension apparatus on such cases as well as the galvanic current. He had obtained some results. He stated he had not used a sinusoidal and could not therefore report on the comparative value of the two currents. He had experimented with both the static charge and the X-ray. He had no report to make as yet.

X-RAY TREATMENT OF TUBERCULOSIS OF THE INTESTINAL TRACT.

At the last meeting of the Chicago Electro-Medical Society Dr. Burdick reported informally a case of tuberculosis of the bowels treated with X-ray. The case was diagnosed by Dr. Chas. Simons. The urine was loaded with albumen; casts too numerous to count; 5½ per cent ures; diarrhoea, 18 to 25 stools per day. After the first treatment of fifteen minutes an improvement in the urine was noticed. The treatments were continued three times per week for four weeks. At the end of this period there was a bare trace of albumen, a very few casts, urea 2½ per cent, the bowels moved once or twice per day. The treatment was continued for three months. At an alleged personal grievance the patient stopped treatment. At the end of five months the patient died suddenly, cause not known.

BRIGHT'S DISEASE TREATED WITH THE X-RAY.

The patient was a traveling man suffering from Bright's disease; blood casts, pus albumen abundant, urea high; extremities edematous; heart affected. The X-ray light was sent through the bowels and kidneys. After three weeks of treatment the casts had entirely disappeared from the urine, the albumen decreased markedly. The patient returned to his work and has reported no further trouble. Very little is proved by two cases, but they at least point to the fact that nutritional effect of the X-ray is very little understood. The effect is deep as well as local.

ANNOUNCEMENT.

After due consideration we have decided to adopt magazine size for our journal, beginning with the January number of the third volume, and believe that such a change will be welcomed by our numerous readers.

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Editorial Management. The "Era" will be edited by Prof. C. H. Treadwell, formerly instructor in Physics in Syracuse University; besides a corps of eminent medical practitioners, and more especially those engaged in Electro-Therapeutics, will be prominent contributors.

Tube and Archive of X-Ray examinations, Clinical Record and the discussions had upon the theory and practice in all its spheres of applied X-Ray radiography, when concisely and comprehensively stated by letters and designs. Such correspondence is respectfully solicited and will receive special care and attention.

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The Era will cover an extensive and exclusive field for makers and manufacturers of X-Ray appliances and Electric machinery, as the medical practitioners will be their best patrons.

NOTICE.

The regular meeting of the Chicago Electro Medical Society will be held on Tuesday, Dec. 30, 8 p. m., room 301 Schiller Building. A paper on the "Cathode Rays" will be read by Mr. Treadwell.

MINUTES OF THE CHICAGO ELECTRO-MEDICAL SOCIETY.

The regular November meeting was held in the Schiller Building on Tuesday, Nov. 25, with Dr. Burdick in the chair.

Minutes read.

The name of Dr. A. R. March had been omitted from the list of elected members of preceeding meeting. Minutes approved as corrected.

Under the order of unfinished business Dr. Burdick reported that a temporary injunction against the other society of the same name was not granted. The matter will not be settled until the hearing upon the permanent injunction. Dr. Andrews then read a paper on the use of the galvanic current in the treatment of diseases of the middle ear. The paper was discussed by Dr. Coleman, Dr. Grubbe, Dr. Burdick and Mr. Fuchs.

The society then adjourned.

EDITORIAL ANNOUNCEMENT.

In our present issue we publish in full the original articles of John B. Murphy, M. D., Chicago, and Russell H. Boggs, M. D., Pittsburg, Pa., as read before the meeting of the American Roentgen Ray Society held at the Sherman House on Dec. 10 and 11. Other original articles, together with discussions by prominent X-ray workers, which were read at the meeting, will be printed in our next issue.

PROGRAM OF THE AMERICAN ROENTGEN RAY SOCIETY.

WEDNESDAY, DECEMBER 10.
Morning Session, 9.30 o'clock.

General business.

Reading of essays.

1. X-Ray Physics, T. Proctor Hall, M. D., Chicago, Ill.

2. Equal Potential Surfaces in X-Ray Field, Jno. C. Pitkin, M. D., Buffalo, N. Y.

3. Instantaneous Skiagraphy, Mihran K. Kassabian, M. D., Philadelphia, Pa.

WEDNESDAY, DECEMBER 10.
Afternoon Session, 2.30 o'clock.

President's annual address.

4. (a) Systematic Records, (b) The Routine Use of the X-Rays, M. J. Wilbert, Philadelphia.

5. Skiagraphy as an Art, J. Rudis-Jicinsky, M. D., Cedar Rapids, Iowa.

6. Results and Technique in Treating Epithelioma with X-Rays, Emil H. Grubbe, Chicago.

WEDNESDAY, DECEMBER 10.
Evening Session, 8 o'clock.

7. The Roentgen Ray as a Therapeutic Force, from a Clinical Standpoint, with Illustrative Cases, John B. Murphy, M. D., Chicago, Ill.

8. Treatment of Three Cases of Cancer, One Case of Tuberculosis and Seven Cases of Rodent Ulcer and Lupus, G. P. Girdwood, M. D., Montreal, Canada.

9. The Technique of Treatment of Malignant Growths, J. N. Scott, M. D., Kansas City, Mo.

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THURSDAY, DECEMBER 11.
Morning Session, 9.30 o'clock.

General business.

10. Radio-Therapy in Pulmonary Tuberculosis, Gordon G. Burdick, M. D., Chicago, Ill.

11. X-Ray Treatment in Intra-Abdominal and Other Deeply Located Malignant Growths, Clarence E. Skinner, M. D., New Haven, Conn.

12. Diagnosis of Calculi by X-Rays, Russell H. Boggs, M. D., Pittsburg, Pa.

THURSDAY, DECEMBER 11.
Afternoon Session, 2.30 o'clock.

13. The Technique of X-Ray Therapy, H. Preston Pratt, M. D., Chicago, Ill.

14. Result of Treatment of Guinea Pigs Affected with Tuberculosis by High Frequency Currents, G. P. Girdwood, M. D., and C. Higgins, D. V. S.

The new officers are:

President—Prof. Goodspeed of the University of Pennsylvania.

Vice-Presidents—John B. Murphy, M. D., of Chicago; Wm. Jordan Taylor, M. D., of Cincinnati, Ohio.

Secretary—James B. Bullitt, M. D., of Louisville, Ky.

Treasurer—Weston A. Price, D. D. S., of Cleveland, Ohio.

Chairman of Executive Committee—James P. Marsh, M. D., of Troy, N. Y.

Members of Executive Committee—Ralph R. Campbell of Chicago, Walter W. Johnson of Rochester, N. Y.

NOTES.

The meetings were largely attended. The papers were for the most part interesting and practical. The meeting brought together many of the most prominent radiographers and radiotherapists of both this country and Canada. The discussions in many instances were of the highest scientific value. While encouraging reports of the value of the X-ray in various lesions were given, many protests were made against the reckless employment of the rays to the exclusion of the other established methods of treatment. In cases of cancer of all varieties many operators favored surgical intervention first, to be followed by the X-ray essay prophylactic.

The discussions on the technique of the skiagraph were satisfactory. Exhibitions of the work done showed that the ray furnishes undeniable evidence of the presence of calculi, whether located in the gall bladder, kidney, ureters or bladder. At the same time, the danger of "seeing everything in the picture" was pointed out.

The manufacturers' exhibit of coils, static machines and tubes was very interesting. Among the firms were W. Scheidel & Co., Western X-Ray and Coil Co., C. F. Birtman & Co., Nelson & Co., Waite & Bartlett, Betz & Co., R. Friedlander & Co., R. V. Wagner & Co., American X-Ray Co., Jerman Medical Electric Co. and Queen & Co.

Membership in the society is no longer easily secured. The executive committee is careful to look up the ethical and scientific standing of all the applicants. Fully eighty members were taken in, among them being the prominent members of the local committee of arrangements, who had not before joined the society. The scientific standing of the society is now assured.

The society has no official organ. One journal had claimed this honor in the past, but without authority. The full proceedings will doubtless be published in pamphlet form. Members were given permission to contribute their papers to any X-ray or medical journal.

A REPLY FROM W. J. MORTON, M. D.

To the Editor of the American Electro-Therapeutic and X-Ray Era:—

"In the report of a discussion upon the X-ray treatment of cancer, appearing in your esteemed journal of October last, I find the following statement, said to have been made by one of the gentlemen who took part in the discussion: "The static breeze pumps the infection into the system. He lost several cases until he discovered this error. Morton, Skinner and Snow have buried patients due to this mistake." So far as I am concerned, I beg you will allow me to state that I have never yet treated cases of cancer by the static breeze or spray, and have never therefore had the sad experience referred to. On one occasion, it is true, I used the static breeze for four treatments in a difficult case, but seeing no particular results abandoned it. I hasten to state that the patient remains in good health. I fail to see, however, that there would be anything reprehensible in treating cases of cancer with the static breeze, and should not hesitate to do so, were it not that I believe that the X-ray is entirely worthy of confidence, and that it is not at present wise to combine two forms of treatment."

Yours very truly,

WILLIAM J. MORTON.

19 East 28th street, New York City.

Comment: We believe that the marked improvement in cases of epithelioma treated with the static breeze as an adjunct to the X-ray successfully disproves the "pumping of infection into the system" by the static breeze. No definite case has been reported of this spread of infection by the breeze. Most operators who do not use the breeze prefer, as Dr. Morton does, to use only one form of treatment.

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X-RAY DIAGNOSIS OF CALCULI.

RUSELL H. BOGGS, M. D., PITTSBURGH, PA.

(With three half-tone illustrations.)

The detection of calculi in the kidneys, ureters and bladder is one of the most useful applications of the X-rays. After a careful examination of these organs, if no calculi are found, a negative diagnosis is valuable, relieving the surgeon of advising, and the patient of submitting, to an unnecessary operation. In order for the radiographer to be able to give a decided opinion it is necessary that his technique should be perfect. Faulty technique is the cause of failure in this as well as in all other radiographic work. An inexperienced operator should not begin with this class of X-ray work any more than the surgeon just beginning to operate should begin with a laparotomy, He should start with lighter work and be able to photograph every part of the body before he attempts making a radiograph of a calculus. The members of this society have no doubt heard of calculi having been located by the fluoroscope, but even if this is possible such a means of diagnosis is not reliable. All cases of suspected calculi of the kidneys, ureters or bladder should be radiographed, as radiography is the only means by which calculi can be diagnosed. A large number of kidney calculi produce only a dull pain in the lumbar region, a slight change in the urine and other obscure symptoms, which could be caused by a floating kidney, chronic nephritis, lumbago or other diseases. The large calculi frequently produce less severe symptoms than the smaller ones, due, no doubt, to their immobility.

A stone in the ureter may simulate appendicitis, ovaritis, salpingitis or cystitis. As a calculus in the urinary tract often causes a variety of symptoms, surgeons have long realized that they have needed some more accurate means of diagnosis. Then when the symptoms of calculi are present the radiographer will not only confirm the diagnosis, but will show the number, size and exact location of the calculi. Therefore, the surgeon is greatly aided by being able to decide which operation is suited to each particular case. He can then perform his operation with the least possible injury to the surrounding tissues. Without an X-ray examination the wrong kidney may be explored; such cases have been known. It is no longer necessary to perform an exploratory operation on the kidney when the surgeon has such means at hand. At the present time the only calculi in the kidneys or bladder which cannot be relied upon to give sufficient density to the radiograph are minute particles of uric acid, and fortunately these are rare, except in children, in whom the diagnosis is not difficult.

So far many cases of gallstone have not been successfully radiographed, partly on account of the gall bladder's being covered by the liver, partly because of its motion during respiration, and partly on account of the composition of the calculi. When the gallstones contain sufficient mineral matter—namely, the calcium and magnesium phosphates, they can be located by the rays. When radiographing the gall bladder the operator must have an apparatus which will carry a large amperage for a short time, but when examining for stone in the kidneys, ureter or bladder a less amperage and longer exposure will answer, as these parts can be kept comparatively quiet. However, the apparatus must be of the very best and the tube one which is self-regulating and gives a uniform light. Some of the tubes contain so much metal besides the platinum that when excited by a powerful current this metal becomes heated and gives off a vapor to such a degree that the vacuum keeps reducing until we have not sufficient penetration toward the end of the exposure. With such a tube you are compelled to begin the exposure with a higher vacuum than you otherwise would, to have penetration during the entire exposure. Almost every operator has a different method by which he gets fairly good results, but as differentiation is the main point, the vacuum should be as low as will secure sufficient penetration to make the radiograph in a reasonable length of time.

The preparation of a patient for examination is very essential. His bowels should be empty; he should not have taken any food or water for at least twelve hours. The patient is placed on the table, on his back, with the plate under him. The plate should be large enough to extend from the tenth dorsal vertebra to the crest of the ilium. The tube is placed almost in the median line over the second or third lumbar vertebra. The time of exposure ranging from two to eight minutes, depends on the size of the patient. If the patient is very large and there is too much abdominal breathing, it is well to bandage the abdomen tightly, and even sometimes fasten this bandage to the table to prevent the patient from moving.

In examining for vesical calculi the bladder should be empty as well as the bowels. As the plate should be as near the calculus as possible, it is desirable to make two radiographs, one with the patient lying on his back and one with him lying on his face; exposure from one to five minutes.

In examining for biliary calculi the patient should be prepared as before stated and lie on his face, but more to the right side with plate under him. For this work in the future I intend to use a Wehnelt interrupter and a very heavy current, thus requiring a very short exposure. I have taken a chest of a man weighing 185 pounds in twenty seconds, showing all detail in the thorax and the region of the liver. The greatest difficulty is to get a tube to stand such a current, as one exposure renders the tube useless until the proper vacuum is restored. At present I have a special tube of extraordinary size, which I believe

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will carry the current for sufficient length of time without destroying the vacuum. I hope to be able to give a full report in the near future.

The plates must be especially prepared for X-ray work and not put in the envelopes until ready for use, as paper absorbs moisture, thus lessening the sensitive surface. Any good developer can be used; the one given by the maker of the plates is usually recommended. The operator who keeps continually changing from one developer to another can never expect to become familiar with any one solution. The best developer is the one that is best understood by the operator.

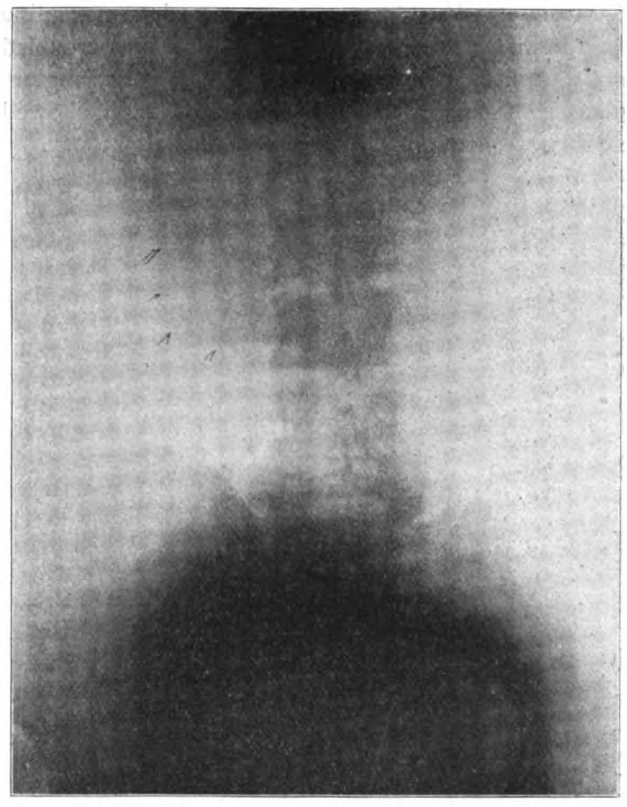
The correct interpretation of the developed plate, without which the previous work is useless, requires an extended experience and close study. This study should be of the plate and not of the print. The plate should be studied in all its conditions and under both artificial light and sunlight.

A radiograph that is nearly enough perfect to show a calculus in the kidney or ureter must show besides the articulations and processes of the vertebræ, the outlines of the last two ribs. For vesical calculi the plate must be clear and show plainly the articulations of the pelvis. In examining for gallstones the plates should be clear and show the ribs and vertebrae, but not too plainly, as in order to secure the best outline of the bones too much of the soft tissues which do not contain so much density are lost. When a plate possesses differentiation enough to show tissue of less density than a calculus, such as the psoas muscle, no stone could escape detection.

Case 1.—Mr. B., referred by Dr. Victor King for an examination, had been suffering with renal colic at intervals for fourteen years. At times it would take three or four hypodermics of morphia to relieve his pain, and for a month previous to this examination he had been unable to work. His urine was heavily charged with mucus and uric acid. During the afternoon in which this patient was radiographed the first time, he had been drinking a great deal of water, and it was with some difficulty that the calculi were found. He came the next day prepared as before stated for examination, and the radiograph showed clearly two calculi surrounded by a pus sac. Dr. King operated a few days later and found the two urinary calculi and the pus sac, thus verifying the radiographs.

Case 2.—Mr. B., referred by Dr. McKenna, with the following symptoms: Vesical irritation, frequent and painful micturition. Some days he would be compelled to urinate every hour, and complained particularly of a dull ache afterward. This patient had a a calculus removed from the bladder eleven years ago, and it was a question whether the scar tissues had become inflamed or a new calculus had formed. Two radiographs of the bladder, one taken in the dorsal position and the other with the patient lying on his face with the plate under him, showed no calculus. Other radiographs taken of the right kidney and ureter showed five small stones in the kidney.

Case 3.—Mr. B., a commission merchant, had been suffering with a dull pain in the lumbar region for a



CASE 2.

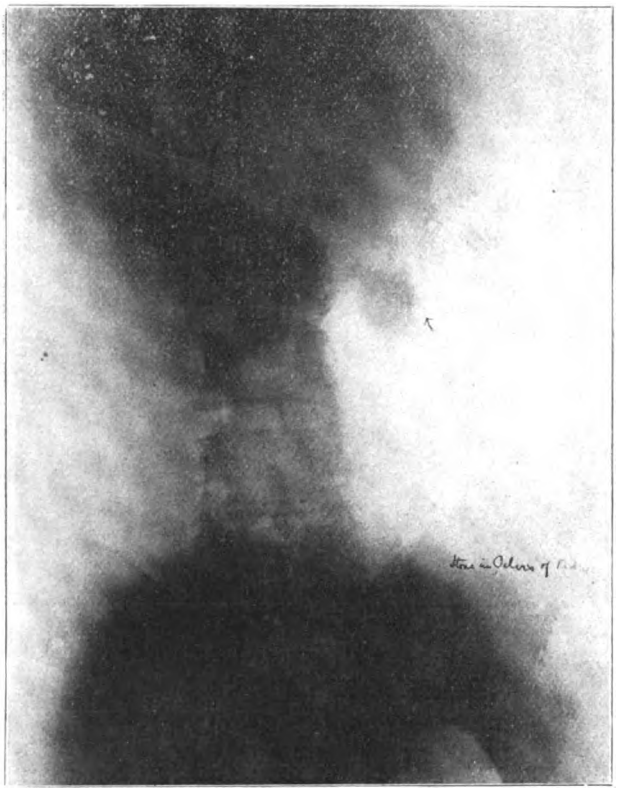
period of twelve years. He had been to many physicians. The greater number of these diagnosed his trouble as intercostal neuralgia, and several pronounced it chronic Bright's disease, as his urine contained a small amount of albumen. Mr. B. stated that he was always better in warm weather, but that he had the dull ache in the lumbar region all winter. A radiograph showed a stone the size of a hickory nut in the right kidney.

Case 4.—Mr. D., an athlete, had been suffering with severe pain in the region of the left kidney for more than fifteen years. It started when he was attending school. At first the attacks occurred about every six months, but later they became more frequent, and lately he had attacks as often as every two weeks. This patient had been to physicians all over the United States, and even had an X-ray examination at one of the large hospitals, but no calculi were found. He said his case had been diagnosed as floating kidney, intercostal neuralgia, lumbago, etc., and even had his ureters catheterized. His attacks were not brought on in the usual way—i. e., by the jarring of trains, street cars or violent exercises, such as playing football. The radiograph showed a calculus in the left kidney.

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Dr. Martin, who referred this case, was the first physician that made a diagnosis of a kidney stone.

Case 5.—Mr. E., referred by Dr. Ferree, had been suffering with renal colic at intervals nearly all his life. Twenty years ago he passed a calculus about the size and shape of a beech nut, after which he was free from attacks for eight years. Then the next nine years he has had no severe attacks, but was troubled almost continually with a pain in the lumbar region, which simulated lumbago. The radiograph showed one large and two small calculi in the left kidney.



CASE 3.

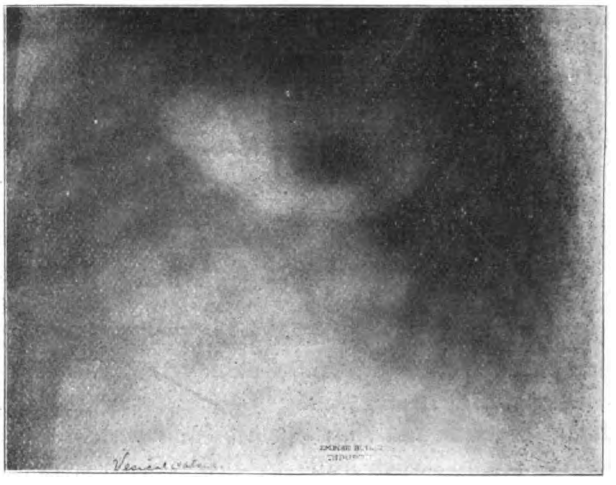
Case 6.—This patient had been suffering six months from vesical irritation. Complained of frequent and painful micturition. He was sounded for stone and a diagnosis of cystitis was given. His bladder was washed out with little or no benefit. The radiograph revealed several small calculi in the bladder.

Case 7.—Mr. C. was referred for X-ray examination because his symptoms indicated both stone in the ureter and appendicitis. The radiograph showed no stone and an operation proved the case to be appendicitis.

Case 8.—Mr. B., an engineer, was suffering from a severe pain in the region of the right kidney. A radiograph showed no stone present. The pain was relieved by a few treatments of brush discharge from a static machine.

Case 9.—A physician was referred by Dr. Stewart for X-ray examination. He was healthy until 1892, when he had grippe. Not regaining his strength, he went to New Mexico, and while there he had his first attack of renal colic. Since then he has had an attack on an average of every two months; generally lasting from ten days to two weeks. Urine was normal. Two radiographs showed a stone to the left of the lumbar vertebræ, and from the shadow cast by the stone it is likely composed of urates.

Case 10.—Mr. C. S. Z. was referred by Dr. Ferree to verify his diagnosis of calculi. The radiograph showed a large calculus about the size of a walnut in



CASE 10.

the bladder. The doctor operated the next day, finding the calculus to be of the size and shape shown by the radiograph.

Case 11.—Referred by Dr. McCready of Alleghany, with the following note: Kindly examine Mrs. S., age thirty-eight, for gallstones. She has been under my care for five months with repeated attacks of colic. Her attacks come on suddenly, they are extremely severe and are only controlled with large doses of morphia hypodermatically. She has averaged an attack every ten days for the past five months. She has searched incessantly for gallstones, but as yet she has never found any stones in her passages. Radiograph showed a collection of stones in the gall bladder. One week after making the radiograph I received a telephone message from Dr. McCready saying that Mrs. S. had just found four small gallstones in one passage, and that they have the appearance of having been agglutinated; likely these were the first she has evacuated.

The next three cases have been previously reported in an article published in the "Journal of Advanced Therapeutics" of October, 1902.

Case 12.—Mr. B., a roller, large, powerful and well nourished, had suffered with a pain in the right side below the arch of the last rib for ten years; at times he was compelled to take large doses of morphine and was unable to work for many days. His pain was

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always increased when riding on trains or street cars, and from other symptoms it was a question of making a diagnosis of renal calculi or floating kidney. He had been to a number of physicians, two of whom had pronounced his case renal calculi. A Roentgen ray photograph showed a stone in the pelvis of the kidney.

Case 13.—Mrs. D., age 35, had suffered for years with a floating kidney, which had been diagnosed by ten or more physicians. From her symptoms several of the physicians suspected a tubercular kidney as well. A radiograph showed a stone in the kidney. Her physician, Dr. Huggins of Pittsburg, who referred this case and the previous one to me, operated and successfully removed the calculi in both cases, thus verifying the radiographs.

Case 14.—Referred by his family physician, Dr. McCready, with the following history: Mr. H., a painter, had repeated attacks of colic. The last time commenced with lead colic, having characteristic symptoms, blue lines on the gums and obstinate constipation. After the usual treatment he was relieved and was about to return to work when he was seized with another very severe attack, which simulated biliary colic. The blue lines on his gums had disappeared and his physicians felt certain that the trouble was due to gallstones. Every stool was examined for a period of four weeks, but no stones were found. A radiograph showed stones in the gall bladder.

DISCUSSION ON DR. BOGGS' PAPER.

Dr. J. Rudis-Jicinsky of Cedar Rapids, Iowa, finds that the use of a plate large enough to cover not only the region of the kidney, but the ureter as well, is a great aid in this work. Errors may be avoided in this way, especially if the work is being done by one who is not an expert. A case in point was cited. No stone was seen in the kidney, but the operator found it in the ureter. He has found examination of the plate for spots and other defects very useful, as these might be mistaken for a stone. He has also found that gallstones containing cholestrin do not show very well, often not at all. This is exceedingly liable to lead to errors and should be taken into account.

Mr. W. C. Fuchs of Chicago said that to make a good radiograph three things are necessary—a good plate, a good tube and a good apparatus. From four to five minutes are required to make a good radiograph of the kidney. He uses a static machine having 28 plates, which gives an electrical discharge about as thick as the wrist. It gives a perfect radiograph, showing all the details, in about six minutes. The hardest stones to find are the small stones. He uses two plates with an envelope around them, and if there is any defect in either plate it will not show in the same place on both plates. He does not believe that there is a plate made which is sensitive enough to take an instantaneous exposure of a gallstone. Furthermore, these exposures must be developed to such a degree that spots are produced on the plate, and it is impossible to tell whether they are a stone or a defect in the plate. In radiographing for renal calculi it is possible to mistake a tubercular mesenteric lymph gland for a calculus. A case of this kind was referred to. He prefers to take two pictures, one a time exposure and the other for as long a time as the patient can hold his breath, about thirty seconds. The sensitiveness of the plate is added to if another plate with an emulsion on it is placed next to the exposed plate. He is of the opinion that if we had a machine for the different parts of the body the work would be improved upon. A static machine with about fifty revolving plates is the machine of the future. For radiographs of the brain the coil and a very high vacuum tube should be used. The same is true of the chest of tubercular patients. The machine is the important part of the outfit.

Dr. Boggs, in closing, advised that it is preferable to verify the findings of the first plate by a second. This will avoid mistaking one thing for another, as mentioned by Dr. Jicinsky and Mr. Fuchs.

X-RAY IN THE TREATMENT OF CANCER AND OTHER MALIGNANT DISEASES.

By Emil H. Grubbe, B. S. M. D., of Chicago, Ill.

The following article was published in the New York Medical Record of Nov. 1, 1902. We abstract in part and print in full other parts of the article.

The writer calls this a preliminary report, but guards against the charge of hasty conclusion by calling attention to the fact that his cases are largely post-operative. Altogether too many reports have been given based on a few isolated cases, indefinitely stated, with poor histories.

ACTION OF THE X-RAYS.

"Many theories have been advanced as to the action of the X-ray in the various conditions for which it has been used. By some the belief is held that restitution of the tissues takes place under X-ray treatment; that is, cancer tissue becomes transformed or is developed into normal tissue. Others, taking for granted that the parasitic or bacterial theories of the origin of some of the diseases treated by the X-ray have been conclusively proven, believe that the X-ray, due to its actinic action, destroys these conditions. These theories seem rather far fetched, however, for, aside from the lack of proof of the parasitic or bacterial origin of the diseases referred to, it does not seem probable, from observations which have been made by various investigators, that the success of the X-ray treatment in these diseases is exclusively due to any bactericidal power which the rays may possess.

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"Personally, we believe the action of the X-ray is the same in all the diseases in which it has been found of value, and also that that action is most plausibly explained when viewed from the standpoint of the theory of phagocytosis followed by leucocytolysis.

"First, it must be admitted that, aside from whatever chemical or electric property the X-ray may possess, the sum total of its action is that of an irritant. Now if we irritate a certain part of the body by making frequent X-ray exposures, we produce ultimately a simple focal inflammation. Inflammation means the determination of much blood to the part, hyperæmia. Due to the increased volume of blood, leucocytes accumulate in large quantities and, finally, stasis occurs, the circulation being cut off, the part dies for want of nourishment. When no suitable nutritive material is at hand there is developed a tendency toward degeneration. No doubt this degeneration is partly, at least, due to an accumulation of the products of the metabolism of cells.

"Primarily, then, the X-ray affects the essential tissue-forming elements of the body. Parts which are walled off decompose chemically and are either discharged or absorbed. The rapid decrease in the size of some growths under X-ray treatment also points to a more general or systemic action, probably due to stimulation of the lymphatics.

"The fact that nearly every case, no matter how severe, treated by the X-ray seems to improve at the beginning of the treatment, shows that it exerts an influence which is not only local, but also systemic. From our personal observations upon several hundred patients we have come to the conclusion that the nutrition of the entire system is affected, through reflex action probably, and this produces a general stimulating and tonic effect. As to the special characteristics of the X-ray in different conditions, our experience teaches that the vitality of all patients is increased. It is surprising how long life may be maintained in some cases. Relief from pain is found in the majority of cases, although if a neuritis is coexistent with cancer, especially in breast cases, very little can be done for the relief of the pain."

Dr. Grubbe makes the following classification of lesions in the order of their relative yielding to X-ray treatment: Lupus, epithelioma nodular returns (post-operative), primary breast cases, tuberculosis of the lungs, tuberculosis of the bones, cancers of soft internal organs, sarcomas, osteosarcomas. It is not claimed that all the above lesions have been positively cured.

Regarding the limits of its usefulness, the following is given:

"It is not recommended that the X-ray take the place of the knife in primary or operable malignant growths, but the results so far obtained by X-ray treatment following operation are certainly sufficient to warrant the careful consideration of the profession. In general, the results of X-ray treatment speak for themselves, and it is unnecessary to present here any argument concerning the practicability of the use of this agent. Enough has already appeared upon this in medical literature.

"It may be well, however, to point out that the whole matter resolves itself into the question of a proper understanding of X-ray phenomena. It is the correct use of this agent for special conditions, with ability to vary its power when necessary, that is essential for obtaining proper results, and not its use in the haphazard manner which is so common to-day, when, through ignorance of its virtues, the X-ray, which is hailed as a triumph by the physician in his struggle against tuberculous and cancerous conditions, becomes a dangerous force in the hands of the incompetent operator. We must not forget that we have a great variety of X-rays to deal with—in fact, to use a comparison, the variation in quantity and quality of X-rays obtainable with one piece of apparatus is much greater than all the varieties and qualities of tones which may be produced upon the keyboard of a piano. Again, different tissues demand different degrees of X-ray value.

"When we understand these facts we can readily see why the treatment of an epithelioma must be different from the treatment of lupus. Ignorance of these facts probably accounts for much of the difference of opinion which exists to-day regarding the therapeutic value of the X-ray."

THE X-RAY BURN.

"The continued administration of the X-ray in any one locality produces, at first, through its irritating influence, a dematitis. If the treatments are unduly continued ulceration of the tissues may occur, but an X-ray 'burn' need never be considered serious. This statement is made because of the many bold announcements which have appeared concerning the 'dangers of burning under X-ray exposure.' Relatively, the inflammatory reaction, or dermatitis, produced by the X-ray is harmless, and, in most cases, if the parts were not meddled with by the application of strong chemicals, especially carbolic acid in some form or other (which, of itself, may cause gangrene), nature would assert her power and make repairs. We believe we have 'burned' every patient treated, and several of them have been 'burned' repeatedly. Concerning the development of the dermatitis, we find that susceptibility varies considerably. Certain individuals develop a decided reaction after the first treatment, whereas others resist the action of the rays to such a degree that it is only after from one to two months of daily treatment that we are able to develop a reaction. In one case daily treatments have been given for over two years, and, although the tube has been placed very

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near the body, nothing more than a slight redness has developed. It is evident from this that an idiosyncracy must exist.

"To prevent the action of the rays upon surrounding tissues a special lead-foil mask is used, which resists the passage of rays to healthy parts. Another precaution might be recommended in order that the 'burning' stage may be retarded—it is the application of plain vaselin to the parts exposed directly to the rays. This substance retards the superficial irritation very much and is especially useful when treating the deeper tissues, and when there is no open ulcer. In all open or broken-down conditions a dermatitis should be rapidly produced."

ILLUSTRATIVE CASES.

"Case 1.—Mrs. M., aged forty years, recurrent carcinoma of right breast. Radically operated upon first time in August, 1900. Recurrence immediately, followed by second operation. Six months after second operation nodules again began to appear in scar tissue, and third operation was performed. After this the nodules remained away for nearly one year, but finally they appeared again, and the patient undertook X-ray treatment. The whole scarred area was filled with a large number of small nodules, each about the size of a pea, which extended even into the axilla. Under X-ray treatment these nodules gradually began to fade away. The patient's appetite improved, pains disappeared, and she felt stronger and was visibly improved in general health, so much so that her friends constantly inform her of her improvement. In this case the treatment was not taken as regularly as recommended. Sittings were given daily for about one month, and on alternate days for nearly four months. Although we do not consider this patient absolutely cured, she certainly shows so much improvement that we think we are justified in calling this a symptomatic or clinical cure.

"Case 2.—Mrs. L., aged forty-eight years, case of scirrhous cancer of right breast. Three years ago last January a small, hard tumor was noticed, which was painful to the touch. Her physician suspected a malignant condition on account of the family history, and an operation was performed, the breast being moved. Last August three nodules began to develop simultaneously in the operation scars. These nodules grew quite rapidly, and since another operation was refused, patient was recommended by her surgeon to try X-ray treatment, which was accordingly begun on September 5 last. Treatment was given daily until November 15, when decided dermatitis developed. The patient was allowed to rest until December 5, when treatments were begun once more and continued daily until January 20, at which time all three of the nodules had entirely disappeared. This case also presented a condition of keloid, which extended over an area of six inches, and which also was very markedly affected by the X-ray exposures.

"Case 3.—Mrs. O., aged fifty-six years, cancer left breast—so diagnosed by several prominent physicians who had treated her. The original growth presented an ulcerated surface measuring seven by five and one-half by two inches. Several severe hemorrhages had taken place and patient was very weak. Discharge foul and very profuse. Glands in axilla swollen and very tender. Pain in growth and surrounding parts constant and, at times, excruciating. Many methods of treatment had been tried during a period of nearly three years, but were found to be of no value, the condition gradually getting worse. Finally X-ray treatment was advised and undertaken. Treatment given every other day for twenty minutes. No improvement or effect was noticed, other than relief from pain, until after the third week of treatment, when decided dermatitis had developed and pains again returned, due to dermatitis. Treatment, however, was continued every other day, tube being placed farther away from affected area, and in about two weeks more a marked change was noticeable. The hollow cavity of the growth seemed to fill in, the edges of the ulcer began to approach one another, and in three months from the beginning of the treatment the wound had healed over entirely and the patient presented the appearance of having been born with only one breast, so slight was the scar. This patient has been under observation for nearly one year, and during this time no recurrence has been noticed. Patient is a very active woman and travels extensively.

"Case 4.—Mrs. A., aged sixty-five years, case of lupus involving entire forehead, left temporal region, left cheek and eye, and extending to the middle of the left side of the nose. The most extensive lupus formation we have ever seen. Primary lesion a pimple, which developed on left cheek bone over fifteen years ago, constantly grew larger until thirteen years ago medical aid was sought. Various local preparations were tried without avail. Lupus area became constantly larger, even though patient has been practically under treatment of some kind or other for the past thirteen years. Two years ago plaster treatment was resorted to without any beneficial result, and since then the growth discharged constantly and itched intensely, and patient became very weak, due to constant irritation. X-ray treatment began December 2, 1901, and continued every day until January 10, 1902, at which time the looked-for dermatitis had developed over the entire area, and the patient was allowed to rest from treatment. Three weeks elapsed before the irritation had run its course, and, at that time, all parts were covered with new and healthy skin. A month later the hair again began growing on head, eyebrows and eyelashes, and not a vestige of the old trouble can be found.

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"Case 5.—Mr. P., aged fifty-five years, lupus on left cheek, surface size of twenty-five-cent piece. Ten years ago patient noticed small festering pimple on cheek, which was opened by scratching with the finger nail. This has never healed over, in spite of the fact that he has been constantly under treatment and tried, among other things, the actual cautery three times, excision once and plaster treatment five times. Patient was sent to us by his son, a physician, and X-ray treatment recommended. Treatment given daily for seven weeks, at which time considerable dermatitis had developed, and patient was allowed to go home and instructed to return as soon as the irritation, due to the treatment, had subsided. The dermatitis did not subside for nearly three weeks, when patient appeared, and we found a small area in the center of the old formation which needed treatment. Accordingly, treatments were again given daily for two weeks, when dermatitis once more developed and patient was again allowed to rest from treatment. On returning two weeks later we were unable to find any trace of the previous trouble, and since that time, now nearly six months, we have seen and examined this patient several times and have been unable to find any return of the lupus.

"Case 6.—Mrs. F., aged fifty years, large scirrhous on left breast of three years' standing. Had injection treatment without any favorable effect. Would not undergo surgical treatment because she had heard of many recurrences following operation. X-ray treatment undertaken April 15, 1901, daily for first two months, after which decided dermatitis developed, and the breast began to break down and discharged not only a large quantity of fluid, but also much solid cancer tissue. This breaking-down process continued for over one month, when the parts began to heal. The growth semed to have been entirely enucleated. Treatments were now given every other day, and in the course of two months or more the wound had entirely healed, and, indeed, without much scarring. This patient has been examined frequently and no return detected.

"Case 7.—Mrs. E., aged fifty-two years. Early in the year 1900 the patient complained of pain in the pelvic region. On consulting several physicians the diagnosis of cancer of the uterus was made and operation was recommended. Operation for removal of entire uterus was performed March, 1900. Following this operation a persistent discharge was noticed. The patient took a severe cold in the month of December, 1900, and symptoms of congestion appeared in the pelvic region, followed by the development of an abscess, which broke and discharged through the vagina. Discharge continued offensive, with occasional very profuse hemorrhages. A second operation was recommended and performed by a prominent surgeon in May, 1901. On making an incision the surgeon found that the cancer had returned and was so extensive in character that he decided not to remove anything. The wound was closed and the husband was told that nothing could be done to save his wife's life, and that she would probably die within a month. During the last week of May, 1901, patient was brought to Chicago and X-ray treatment was undertaken. Daily treatments of ten minutes' duration were given, and at the end of two months the patient had gained twenty-two pounds, was free from pain and the foul discharge had almost entirely ceased. At the end of three months she was discharged symptomatically cured, and she remains so to this writing. During the past eleven months she has gained thirty-five pounds, and writes, 'I continue to keep well; have not felt so well in years.'

"We have a number of other patients who have taken X-ray treatment and who have remained free from recurrence for periods ranging from six months to a year and a half. Many other cases could be cited, but time and space forbid."

CONCLUSIONS.

" 1. The X-ray is the most remarkable therapeutic agent of the last decade.

2. In properly selected cases of so-called "incurable conditions" the X-ray has brought about remarkable results.

3. Relief from pain is one of the most prominent features of the treatment.

4. Retrogressive changes are noticed in all primary cancer or tuberculous growths.

5. The X-ray has a pronounced effect upon internal cancers.

6. The greatest value of the X-ray is obtained in treating post-operative cases to prevent recurrences.

7. The proportion of clinical cures by this treatment is greater than that obtainable by any other method of treatment.

8. We are positively justified in assuming an idiosyncrasy to X-rays.

9. The peculiarities of each case must be studied in order to get the best results—i. e., no strict rules for treatment can be laid down.

10. Dermatitis, if properly produced, is within certain limits a desirable feature of X-ray treatment.

11. Since the vacuum of an ordinary X-ray tube changes constantly ,such tubes are useless for radiotherapeutic work, and only tubes which allow of perfect control of vacuum should be used.

12. The X-ray has a selective influence upon cells of the body; abnormal cells being affected more readily than the normal.

13. Hemorrhages and discharges are decidedly lessened and, ultimately, cease in the majority of cases.

14. Even in the hopeless, inoperable cases the X-ray prolongs life, makes the patient comfortable and the last hours free from pain."

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THE X-RAY IN CANCER.

Report of four cases published in the Medical Herald by Dr. W. J. Bell:

The first person to come under my care for treatment by the x-ray was Mrs. A., 39 years of age. No unusual element in family or personal history was elicited. She sought my counsel early in May of the present year for the removal of what she and her medical attendant had concluded was uterine polypi. She gave a record of almost continuous hemorrhage from the uterus for two years past, for which difficulty she had been almost constantly under treatment. Her extreme pallor, great weakness and progressive emaciation accompanied by an odor so disagreeable as to make it impossible for her to remain in the company of others, aroused suspicions that were quickly confirmed upon examination. The entire cervix and much of the body of the womb was destroyed, and an extended surface of grape-like excrescences, readily broken down by even the most careful manipulation, accounted for the continued hemorrhage. The patient was so weak that she could not walk more than a block and a half without giving out completely. With such an outlook, with no promise save to do the best I knew she began treatment. A tube of medium density at a distance of nine inches from the diseased tissues excited by a Fessenden coil was used for treatment, the duration of exposures was twelve minutes daily the first three applications, after this the time ranging from seven to twelve minutes each exposure. By the time the third treatment had been given there was cessation of pain, odor and discharge in a most marked degree, and complete cessation of these manifestations in less than ten days. Treatment was persisted in for four weeks, when the patient was so much improved that she was permitted to go to her home for a week. In a little over a week she returned, having improved in every way. Treatment was again taken up for nine days when she was a second time permitted to go home for over three weeks. At this writing she is under treatment, and expresses herself as feeling well and able to walk five miles if necessary. There is an entire absence of any of the symptoms indicating active malignant disease. She will be permitted to go to her home for a month. I have no opinion to express regarding the case, leaving the facts to speak for themselves.

CASE II.—Mr. B., 58 years of age, presented himself for examination and counsel May 19th last. Family history good; personal history one of steady, difficult work; irregular hours, constant exposures and great mental strain. A steady drinker, but not to drunkenness. Patient stated that he had not been under a physician's care, but had taken different remedies prescribed by that dangerous, though well meaning ignoramus, whose self-confidence is as measureless as his capacity for destruction is boundless, "a friend of mine." No benefit was derived from the remedies suggested so that the patient reported a steady decline in weight and strength for nearly nine months. Associated with this decline there was marked loss of appetite, loss of the sense of taste, and most distressing pain in the hypogastrium. A most aggravating symptom, most persistent in its manifestation was constant spitting. Physical examination disclosed great emaciation, and made known the presence of quite a large mass in the hypogastric region in the abdominal cavity, inclining more to the left side. The growth was about the size of an ordinary fist, and possessed a good deal of mobility. It was found to correspond to the greater curvature of the stomach, the latter having been dragged downward by the weight of the growth. The diagnosis of cancer was made and the x-ray advised as a forlorn hope. A more remarkable response to treatment could scarcely be imagined. The patient was so weak that he had to be carried to the office, and he had already lost over thirty pounds in weight. By the time the third treatment had been given all pain had ceased, the pyrosis had disappeared and the appetite was restored. It seemed impossible to impress the patient with the seriousness of his malady and the necessity of husbanding his strength. Refusing the elevator he would climb four flights of stairs. In less than two weeks, he had twice or three times in one day marched in a street parade. He freely confessed to having eaten forbidden foods and gone to excess in drinking. The inevitable collapse came and the patient died in the latter part of August. I do not believe this patient could have been cured entirely. I do believe that his life might have been prolonged many months in comfort had he known just how to care for himself while battling with his conquering foe.

CASE III.—Mrs. C., age 40; excellent family and personal history. Patient gave history of having been operated upon in February, 1898, for cancer of right breast. A second operation became necessary in just one year from time of first operation. A third operation was performed in October, 1900. At the request of her family physician. Dr. James Hanson, of this city, I removed a recurrent growth in April, 1901. June 9th of the present year the patient came to my office for x-ray treatment. The malady was typical of its kind. There was marked fixation at the shoulder joint, humerus scapula, clavicle and adjacent anatomical structures moved as one piece, while along the line of incision in the axilla several growths the size and shape of a medium-sized strawberry presented. The arm was much swollen, the edematous condition extending to the hand. A foul odor demonstrated the presence of necrotic tissue. Pain had existed for over five months. The patient altogether presented an appearance of unutterable despair, her face marked with lines cut deep by suffering and fear. After the third treatment with the tube set at seven inches the platinum cherry red and the time of exposure being respectively

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eleven, ten and five minutes, the patient reported entire cessation of the pain, and in its stead a feeling of well-being so satisfactory that she had been able to sleep a whole night, something she had been unable to do for a long time. Before ten days had elapsed the malignant growths already described, had melted away. With the cessation of pain and a general gain in every way the patient ceased coming for treatment.

CASE IV.—Mr. D., age 82, consulted me less than two months ago for sore on the side of his temple. The history of the trouble was perfect in detail, the patient being a close and careful observer, so that there was no difficulty in making a diagnosis of mild superficial epithelioma. This case differed from any I have met in that only the shortest exposures were permissible. The trouble disappeared as by magic in about three weeks, leaving the temple smooth and natural, save for a slight depression at the site of the disease. Time of exposure less than four minutes, with tube eight inches distant. Treatment was not oftener than alternate days, and sometimes three or four days, as the condition demanded.

Comments. Dr. Bell mentions the divergence of opinions regarding the tube to use, some blaming the low tube for bad effects in treatment, others the high tube. He mentions similar divergence of opinion regarding the merits of the apparatus to energize the tube. He holds that any vacuum tube excited by coil or static machine will be effected under proper conditions. In our opinion we would say that this is the view of the majority of x-ray operators, most of them preferring a low tube for superficial growths. The papers and the discussions in the meeting of the American Röntgen Ray Society will doubtless do much to establish the proper technique, although it is safe to say that no rules will be laid down, only general principles stated.

CORRECTED MAL-UNION IN FRACTURES OF THE RADIUS AND ULNA OF BOTH FOREARMS:

By Carl Beck, M. D., of New York.

Thorough adaptation of the fragments is essential to preserve the functional ability of the bones of the Fracture of either the radius or the ulna alone when perfect coaptation is not secured may prevent supination to such an extent that the unfortunate patient may be prevented from following his occupation. How much more is the functional ability impaired when, after fracture, both bones unite in false positions, with overlapping of the fragments and angular deformity.

To what extent the Röntgen rays enable us to overcome some of the technical difficulties, even in desperate conditions, is illustrated by the following case:

Both forearms of a laborer, aged thirty-four years, were caught in the wheel-strap of a powerful machine and broken. The patient was brought to the hospital, where proper efforts were made to reduce the displaced and partially splintered fragments.

At first reposition seemed to have been successful, and the swelling disappeared, but both hands remained stiff and paralyzed, and, excepting the thumbs, were without sensation.

Extensive œdema having repeatedly been present, the disturbance in motion as well as in sensibility seemed to me to be of an ischæmic nature rather than caused by a direct trauma to the nerves. The muscular atrophy, which is still present, also points to a breaking down of contractile muscular elements. By the courtesy of Dr. Norris, of Passaic, I had an opportunity to see the patient, for the first time on July 24th, three months after the injury. I then found angular deformity, abnormal mobility, and the functional disturbances described above on both sides.

The skiagraphs of both forearms showed considerable overlapping. In the right forearm overlapping of the radial fragments existed in the middle, and lateral deviation of the ulnar fragments an inch below. The skiagraph of the left side shows the overlapping of both sides, and also the formation of a bone bridge between the lower fragment of the ulna and the upper fragment of the radius, which alone would exclude any possibility of rotation.

On August 3, I concluded to correct the position of the fragments of the right forearm by exposing and freeing them. Under the guidance of the skiagraph I made a semilunar incision in an oblique direction, and overcame the shortening by resorting to forcible extension. The fragments were then united by silver-wire sutures. The *modus operandi* consisted in freeing the old adhesions thoroughly with knife and chisel and folding the arm, so to say, completely. By encircling the two antibrachial fragments with a strong bandage the folded mass could be steadied by an assistant, so that the necessary holes could be bored in both fragments of ulna and radius respectively. As shown by the skiagraph, taken six weeks after this operation, the radial fragments are in ideal apposition. The ulnar fragments show light lateral displacement, while the callus formation has assumed so fortunate a character that no other depression or protrusion remains.

Five days after the first operation the left side fracture was exposed in the same way. In spite of extensive exposure of the fractured area the fragments could not be forced into apposition except by shortening them. So I made a virtue of necessity by giving the ends of the fragments a triangular shape, which enabled me to indent them into each other. As the skiagraph shows, taken four weeks after this operation, the apposition of the radial fragments is perfect. The ulna does not show lateral deviation, none

*Case presented to the Surgical Section of the New York Academy of Medicine, October 14, 1902.

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of the medullary lines presenting any axial divergence. The skiagraph showed, however, that there was a slight angle, which could be corrected in time by simple pressure.

Union took place by first intention without any reaction. The healing process was quicker on the left side, which is explained by the absence of wire-suturing. To be sure that consolidation was perfect, I immobilized the arm until the present time, leaving off the plaster-of-Paris splint temporarily for the employment of massage. The final result will, no doubt, be perfectly satisfactory.

Thus we see how the happy era of combined asepsis and skiagraphy permits of the correction of even the most extensive deformities in a simple and safe manner.

From a theoretical point of view it should be expected that on account of the more abundant callus-proliferation, induced by the irritation of the wire sutures, consolidation would be quicker and more thorough. But practice proved the contrary in this instance, and it seems to be that indentation permits of more accurate adaptation and immobilization. At the same time larger surfaces for agglutination are obtained and the soft tissues are less liable to be disturbed. The triangular indentation of the fragments should therefore be preferred, whenever possible.

The modus operandi for indentation is practically the same in the other case.

(Reprinted from the American Journal of the Medical Sciences.)

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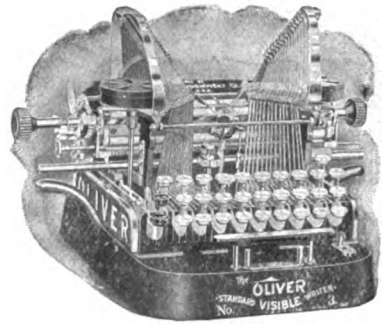
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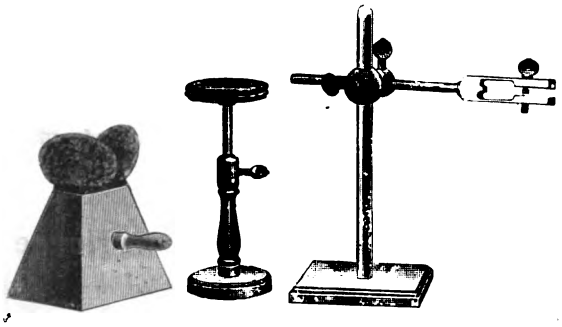
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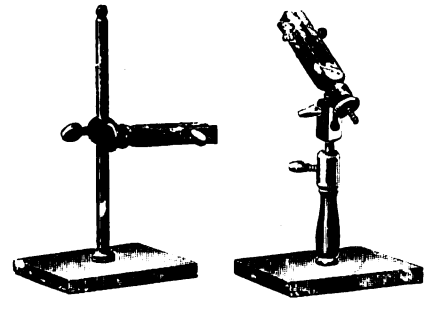
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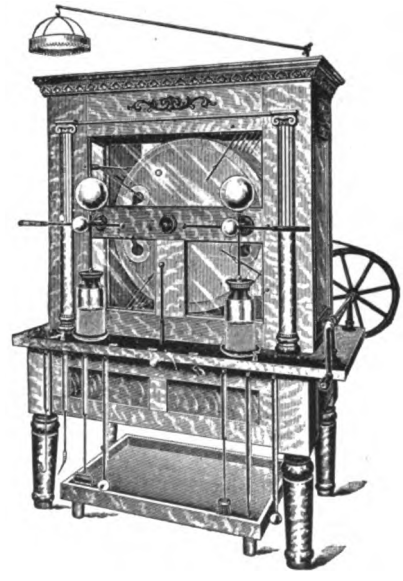
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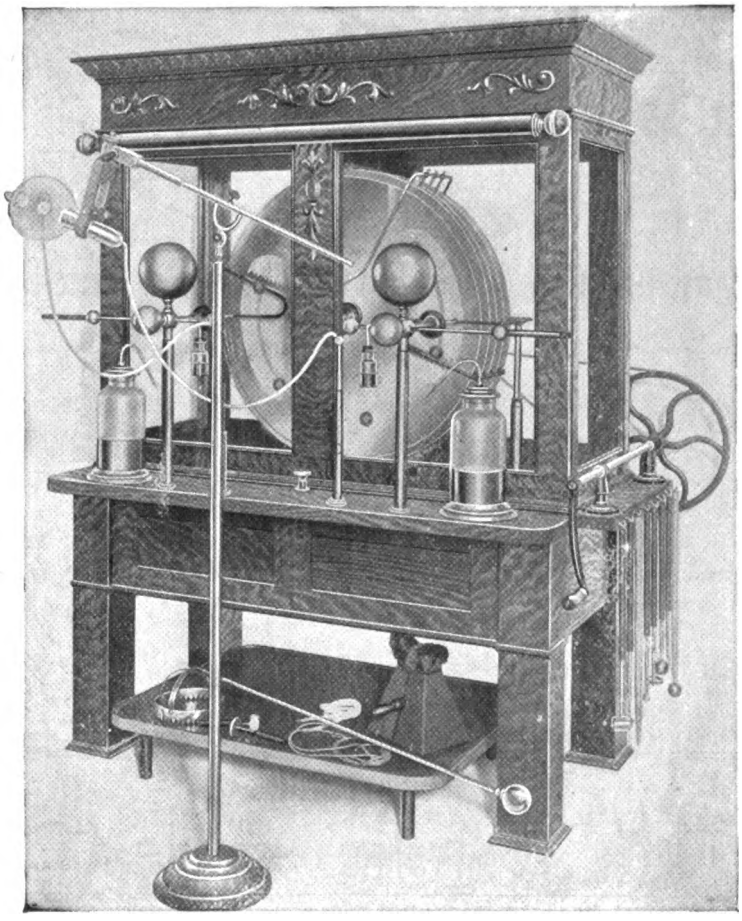
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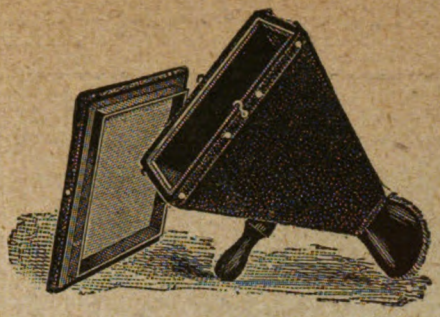
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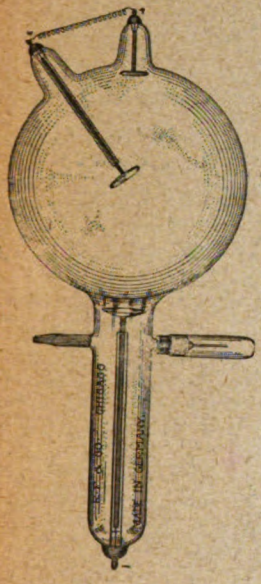
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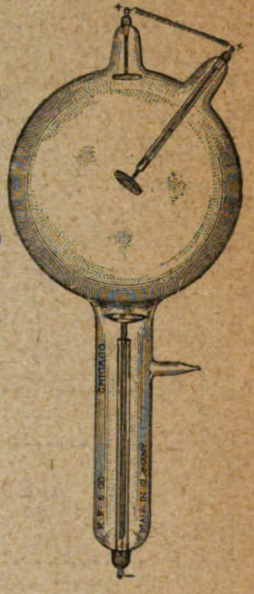
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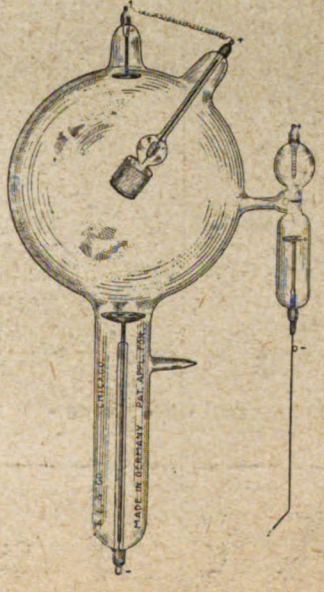
Just Out!

Our New

X-Ray Tube Catalogue

Write for it.





The R. F. Universal Regulating Tube

With all the latest improvements. Two new patents applied for.



1132 Masonic Temple,

Telephone, 2957 Central.

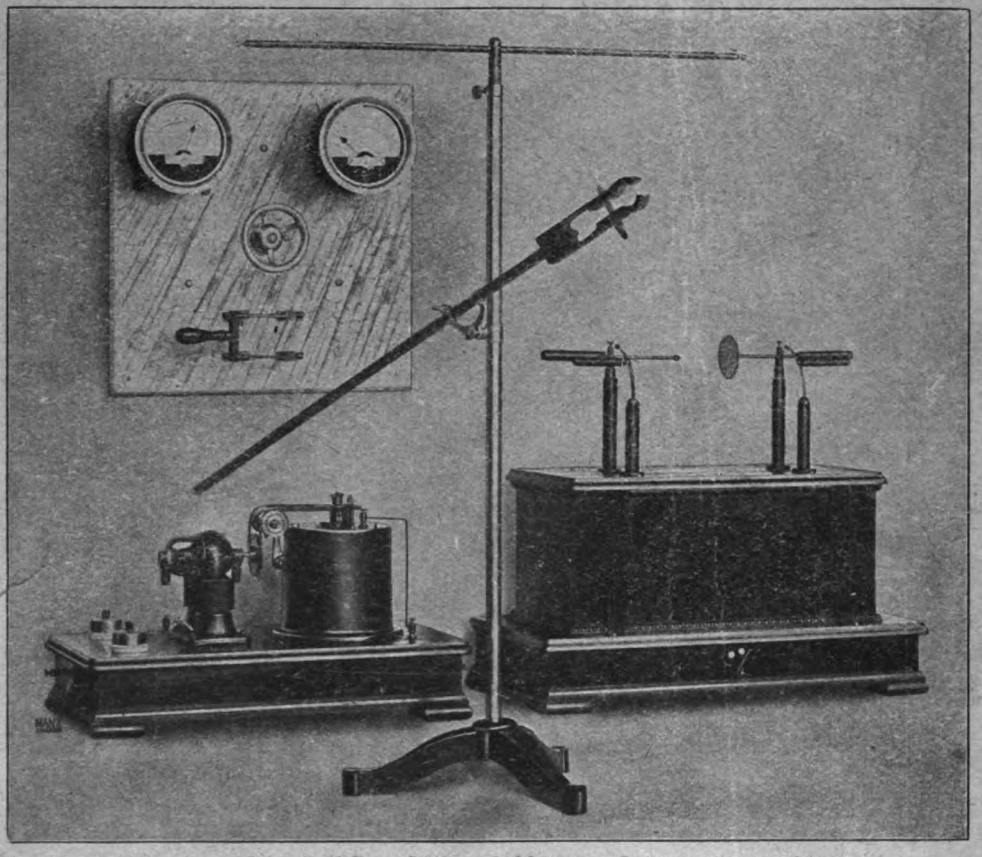
CHICAGO, ILL.

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Why the Western X-Ray Coil is the Best.

Because it will work equally as well on the alternating, as on the direct current.
Because it is the smallest current consuming coil made.
Because it will take skiagraphs in a shorter time than any other coil.
Because of short exposure all danger of burning is eliminated.
Because it is equipped with spark leapers, thus saving X-ray tubes from heating.
Because it is easily regulated to give a mild current for treatment of skin diseases.
Because it will not burn out or break down.
Because it is the most powerful coil compared to size on the market.
Because you can use the smallest to the largest tube without heating.
And last but not least, because it is guaranteed in every respect.

We wish to call special attention to the fact that our coil is being operated on the alternating current with the greatest success and giving the very best of satisfaction for treatment of skin disease and X-Ray work. We can refer you to hospitals and physicians who have taken skiagraphs of the hand instantaneous, chest, 30 seconds, and pelvis 1¼ minutes, on the alternating current.



Western 12-inch X-Ray Coil with Mercury Interrupter on base.

WESTERN X-RAY and COIL CO.

18-30 WEST RANDOLPH STREET, CHICAGO.

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